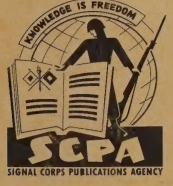
INSTRUCTION BOOK

FOR

RADIO SETS AN/VRC-6, -6X, and -6Y



MANUFACTURED BY

MOTOROLA INCORPORATED

ORDER NO. 11661-PHILA-52-93

20 MAY 1953

THIS ADDENDA WILL REMAIN IN EFFECT ONLY UNTIL THE INFORMATION IS PUBLISHED IN AN OFFICIAL DEPARTMENT OF THE ARMY PUBLICATION.

ADDENDA NO. 2

12 NOVEMBER 1953

ADDENDA NO. 2 TO INSTRUCTION BOOK FOR RADIO SETS AN/VRC-6, -6X, AND -6Y

The following information, published on Order No. 11661–Phila–52, provides information to be added to the instruction book. This addenda supersedes Addenda No. 1, 14 August 1953.

Personnel using this equipment and having custody of this addenda will enter suitable notations beside each affected paragraph and figure in the instruction book to indicate the presence of this supplementary information.

Change "Electrical Equipment Cabinet CY–938/VRC" to read: Electrical Equipment Cabinet CY–938A/VRC wherever it appears in the instruction book.

Page 8. Par. 10. Change the information for the ninth item as follows:

Component	Radio Set AN/VRC-6Y	Radio Set AN/VRC-6X	Radio Set AN/VRC-6	Height (in.)	Dimensions of components			
					Depth (in.)	Length (in.)	Volume (cu ft)	Weight (lb)
Electrical Equipment Cabinet CY–938A/VRC (with hardware)	1	1	1	16½	10½	19 5/16	1.05	33

Page 16. Par. 20. Delete the second sentence and substitute the following: The resistance of the carbon button microphone is 40 ohms, and the impedance of the receiver is 300 ohms.

Page 17. Par. 22. In the chart, delete the third item entirely.

Page 18. Par. 22. Add the following to the list of running spares:

Item	Equipment		
	Radio Set AN/VRC-6Y	Radio Set AN/VRC-6X	Radio Set AN/VRC-6
Handset holder	1	1	1

Page 35. Table II. Adjustment column. Tenth line. Add the following after "reading is obtained": Operate TUNE-OPERATE switch S302 to the OPERATE position.

Page 46. Fig. 32. On the "AUDIO AND SQUELCH PLUG-IN UNIT", change "AUDIO OUTPUT" to read: AUDIO POWER AMPL.

Page 53. Fig. 36. On "V122" stage, change "AUDIO OUTPUT" to read: AUDIO POWER AMPL.

Page 60. Fig. 42. Make the following changes in figure 42:

Change "6V" on terminal 7 of TB1501 to read: 1.25V.

Add the following to the notes:

4. ON RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 496 OR HIGHER, ADD A TERMINAL 3 TO TERMINAL BOARD TB1501 AND CONNECT IT TO PIN K OF JACK J1501.

5. ON ALL RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 601 OR HIGHER, ADD A JUMPER BETWEEN PINS E AND H OF JACK J1501, DELETE THE LEAD BETWEEN TERMINAL 19 OF TB1502 AND PIN D OF JACK J1501, AND REVERSE THE NUMBERS ON PINS 19 AND 20 AND TRANSPOSE TERMINALS 11 AND 12 OF TB1502.

Page 61. Par. 67*b*. Delete subparagraph (3) and substitute the following:

(3) *Transmitter audio.* On Radio Set Control C–847/U units with serial numbers from 1 to 600, the output of the handset microphone is taken from the control unit through terminals C and D of J1501 and terminals 19 and 20 of TB1502. On Radio Set Control C–847/U units with serial numbers 601 and higher, the handset microphone circuit is completed to ground from terminal 19 of TB1502 through terminals C and E of J1501. Refer to paragraph 69 for more information concerning connections between the microphone and transmitter.

Page 61. Fig. 43. Make the following changes in figure 43:

Change "AUDIO OUTPUT" on V122 to read: AUDIO POWER AMPL.

Add the following to the notes:

4. ON ALL RADIO SET CONTROLS C–847/U WITH SERIAL NUMBERS 601 AND HIGHER: TRANSPOSE TERMINALS 11 and 12 ON TB1502; DELETE THE LEAD CONNECTING FROM TERMINAL 12 OF TB805 TO THE NEW TERMINAL 11 OF TB1502; DELETE THE LEAD CONNECTING FROM TERMINAL 11 of TB805 TO THE NEW TERMINAL 12 OF TB1502; CONNECT TERMINAL 12 OF TB805 TO THE NEW TERMINAL 12 OF TB1502.

Page 62. Fig. 44. Add the following note to figure 44:

NOTE: ON RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 601 OR HIGHER, TRANSPOSE TERMINALS 11 AND 12 ON TB1502 WHEREVER THEY APPEAR.

Page 63. Par. 67*b*(4). Line 2. Change "less" to read: more.

Page 65. Fig. 45. Insert figure 45.1 after figure 45.

Page 65. Fig. 46. Add the following note to figure 46:

NOTE: ON AUDIO & SQUELCH PLUG-IN SUBASSEMBLIES WITH SERIAL NUMBERS 1214 AND HIGHER, CHANGE THE VALUE OF R142 FROM 470K TO 330K. ALL RADIO RECEIVER R–257/U UNITS ARE SHIPPED FROM THE FACTORY EQUIPPED WITH THESE MODIFIED AUDIO & SQUELCH SUBASSEMBLIES.

Page 66. Par. 71*b*. Line 11. Change "L241" to read: L239.

Page 67. Par. 73*b*. Delete the first sentence and substitute the following: Crystal ovens E231 and E301 are operated directly from the 24-volt source.

Page 81. App II. Par. 1. In the "Name of part and description" column, line 2 of the first, second, and third items change "30 w output" to read: 25 w output.

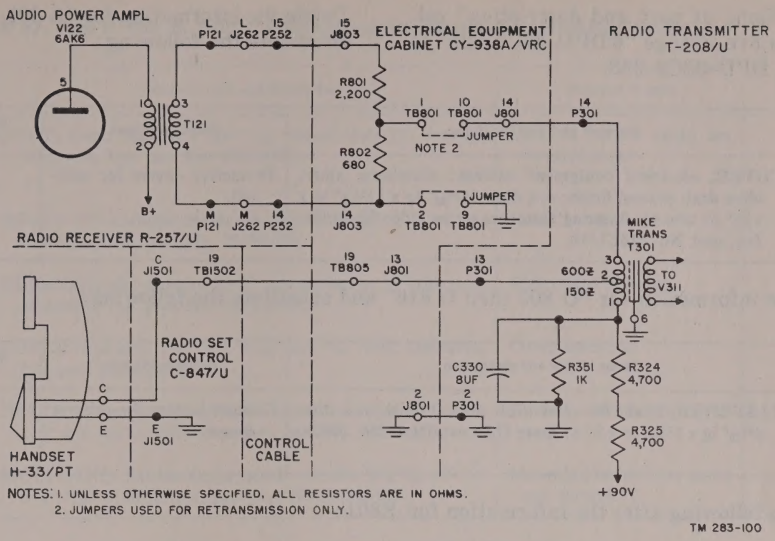


Figure 45.1. Microphone and retransmission audio circuits (applies to Radio Set Control C–847/U units with serial numbers 601 and higher).

Page 82. App II. Par. 1. Make the following changes in paragraph 1:

In the "Name of part and description" column, fifth item, line 2, change "50 w" to read: 25 w.

Add the following after the fifth item:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	AN POWER SUPPLY PP–868/U: vibrator type; synchronous; output data, dc; 155 v, .015 amp; 150 v, .005 amp; 140 v, .060 amp; 1.4 v, 1.25 amp, regulated; –40 v, .0005 amp; ac; 6 v, .45 amp; input data, 12 v dc, 2 amp; 7″ lg x 6¼″ w x 5″ h o/a; filter incl; four 8-32 tapped mtg holes on 4¼″ x 5⁹⁄₁₆″ mtg/ctr; tropicalized; Motorola, Inc. part No. 201V1195.	12-volt dc power supply for the receiver.	

Page 83. App II. Par. 2. Make the following changes in paragraph 2:

Delete the first item and substitute the following:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	CABINET, ELECTRICAL EQUIPMENT CY–938A/VRC: aluminum; olive drab enamel finish; o/a dim. 19⁵⁄₁₆″ lg x 10½″ w x 16½″ h; has 3 sets of mtg rails and 3 female connectors; has 12 spring catches for holding waterproof covers; 5 holes on ea end for attaching to mtg; Motorola, Inc. part No. 201V1880.	Cabinet for Radio Sets AN/VRC–6, –6X, and –6Y.	

In the "Name of part and description" column, item five, change "#DPD–32C2–335" to read: No. DPD–32C2–33S.

Delete the information for "A 801, A802" and substitute the following:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
A 801, A 802	COVER, electrical equipment cabinet: aluminum alloy; olive drab enamel finish; o/a dim. $18\frac{29}{32}$" lg x $11\frac{11}{32}$" w x $1\frac{1}{2}$" h; mts by 3 spring fasteners on ea side; Motorola, Inc. part No. 215C1310.	Protective covers for cabinet.	

Delete the information for "O 805 thru O 816" and substitute the following:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
O 805 thru O 816	FASTENER, latch: SS; olive drab enamel finish; o/a dim. $2\frac{11}{16}$" lg x $1\frac{13}{64}$" w x 2" d; Amer Hdw catalogue No. 15828.	Cabinet latches for cabinet covers.	

Insert the following after the information for E801:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
H801, H802, H803	CLAMP, electrical: black Saran plastic; o/a dim. $\frac{13}{16}$" lg x $\frac{1}{2}$" w x $\frac{5}{16}$" h; accommodates material up to $\frac{1}{4}$" max dia; Commercial Plastics Co. part No. CPC–1949–4; Motorola, Inc. part No. 242T1002.	Cable clamp.	
H804, H805, H818	CLAMP, electrical: black Saran plastic; o/a dim. $\frac{61}{64}$" lg x $\frac{1}{2}$" w x $\frac{1}{2}$" h; accommodates material up to $\frac{3}{8}$" max dia; Commercial Plastics Co. part No. CPC–1949–6; Motorola, Inc. part No. 242T1030.	Cable clamp.	
H819	CLAMP, electrical: spring steel; o/a dim. 1.567" lg x .625" w x 1.24" h; accommodates material up to $\frac{7}{8}$" max dia; Tinnerman Prod part No. A3044SF–7–.3G; Motorola, Inc. part No. 242T1060.	Cable clamp.	

Page 84. App II. Par. 2. Make the following changes in paragraph 2:

In the "Name of part and description" column, first item, change "$\frac{3}{16}$" ID" to read: "$\frac{5}{16}$" ID.

Delete all information for "H809 thru H811".

Page 85. App II. Par. 3. In the "Name of part and description" column, second item, change "#22A1006" to read: No. 222A1006.

Page 85. App II. Par. 5. In the "Name of part and description" column, delete the information for E3551, E3552 and substitute the following:

TERMINAL, lug: rd tongue end type: copper; accommodates #8 AWG wire; o/a dim. $1\frac{3}{32}$" lg x $\frac{13}{32}$" w d $\frac{9}{32}$" h; $1\frac{13}{64}$" mtg hole; Motorola, Inc. part No. 929R106.

Page 86. App II. Par. 6. In the "Name of part and description" column, item three, change ".687" lg" to read: .75" lg.

Page 87. App II. Par. 6. In the "Name of part and description" column, last item, change "shaft $\frac{1}{4}$" lg w/double flats" to read: shaft $\frac{3}{4}$" lg w/double flats.

Page 86 and 87. App II. Par. 6. Add the following in correct alphabetical order:

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
H1505 thru H1512	BOLT: steel; .135″ w x .437″ lg; #10-32 thd; 5/8″ nom lg; Motorola, Inc. part No. 203B1008.	Used to secure radio set control cover.	
A 1504	BRACKET: L-shape; steel; o/a dim. 3″ lg x 3 3/8″ h x 1″ d; Motorola, Inc. part No. 207B1435.	Holds handset clip.	
H1515	CLEANER, air: aluminum; 1″ across flats x 3/8″ thk o/a; Motorola, Inc. part No. 201B1503.	Watertight breather.	
A 1503	COVER: o/a dim. 7 1/2″ lg x 5 3/16″ w x 47/64″ thk; Motorola, Inc. part No. 215C1210.	Cover assembly.	
H1513	HOLDER, handset: Beryllium copper; o/a dim. 2 1/2″ lg x 1 1/2″ w x 21/32″ h; Motorola, Inc. part No. 242B1176.	Holds handset when not in use.	
H1514	MOUNTING: flat bar shape; steel; o/a dim. 9 3/4″ lg x 2 11/16″ w x 1 11/16″ h; Motorola, Inc. part No. 207C1093.	Mounting bracket for radio set control.	

Page 89. Fig. 49 (fold-in). Make the following changes in figure 49:

On the left side of the illustration, delete connector (P801) and the two leads connecting to J804.

Connect a lead from the center of J804 to the center of P801.

Page 91. Fig. 50 (fold-in). Change "HR301" to read: E301.

Page 93. Fig. 51 (fold-in). Change "HR301" to read: E301.

Page 95. Fig. 52 (fold-in). Make the following changes in figure 52:

Transpose terminals 2 and 7 of RT1301 and RT1302.

Reverse the positions of R1301 and L1301.
Change "J1302" to read: J1306.
Change "J1301" to read: J1305.

Delete the lead running from the junction of RT1302, RT1301, and CR1301 to terminal 5 of K1301.

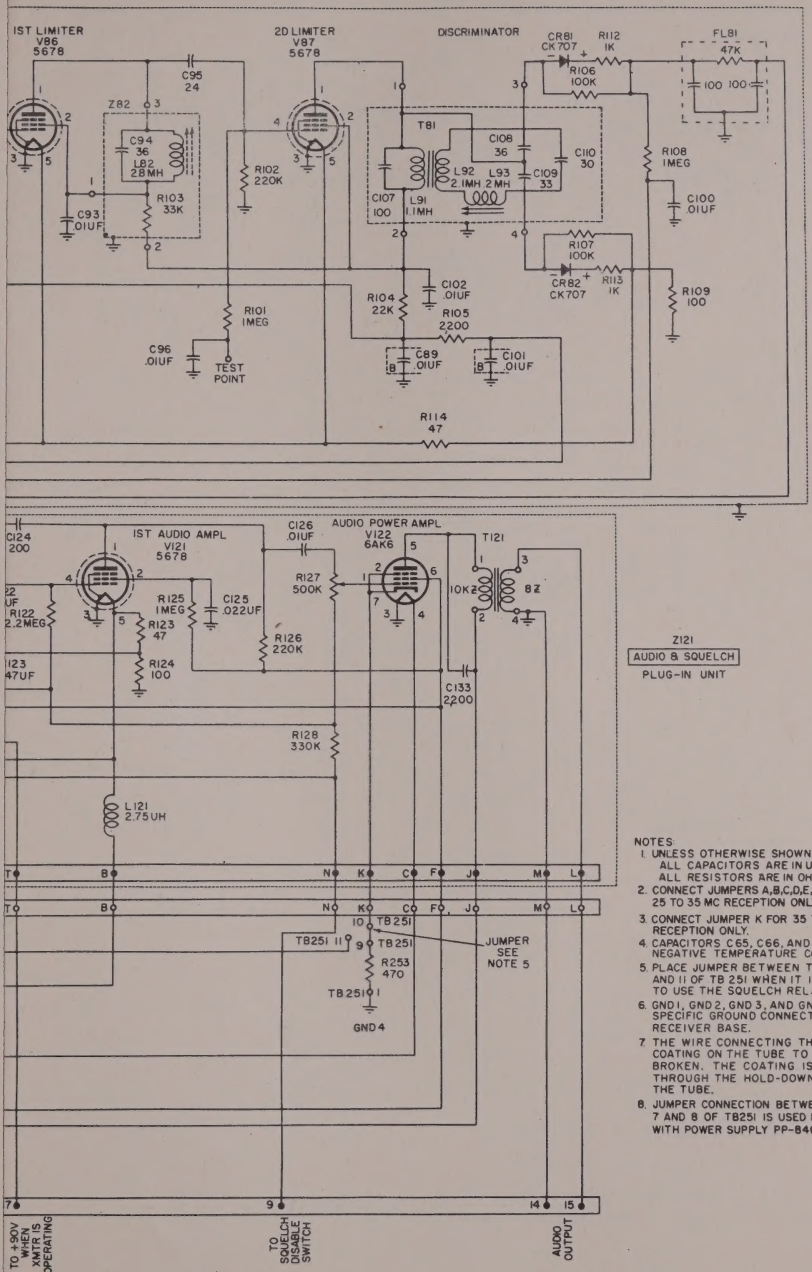
Add resistor R1313 (40 ohms) from terminal 7 to terminal 5 of K1301.

Page 100. Fig. 56. Transpose terminals 4 and 6 of relay K3103.

Page 102. Fig. 58. On the figure caption, change "PP–869/G" to read: PP–869/U.

Page 105. Fig. 61 (fold-in). Add figure 61.1 after 61.

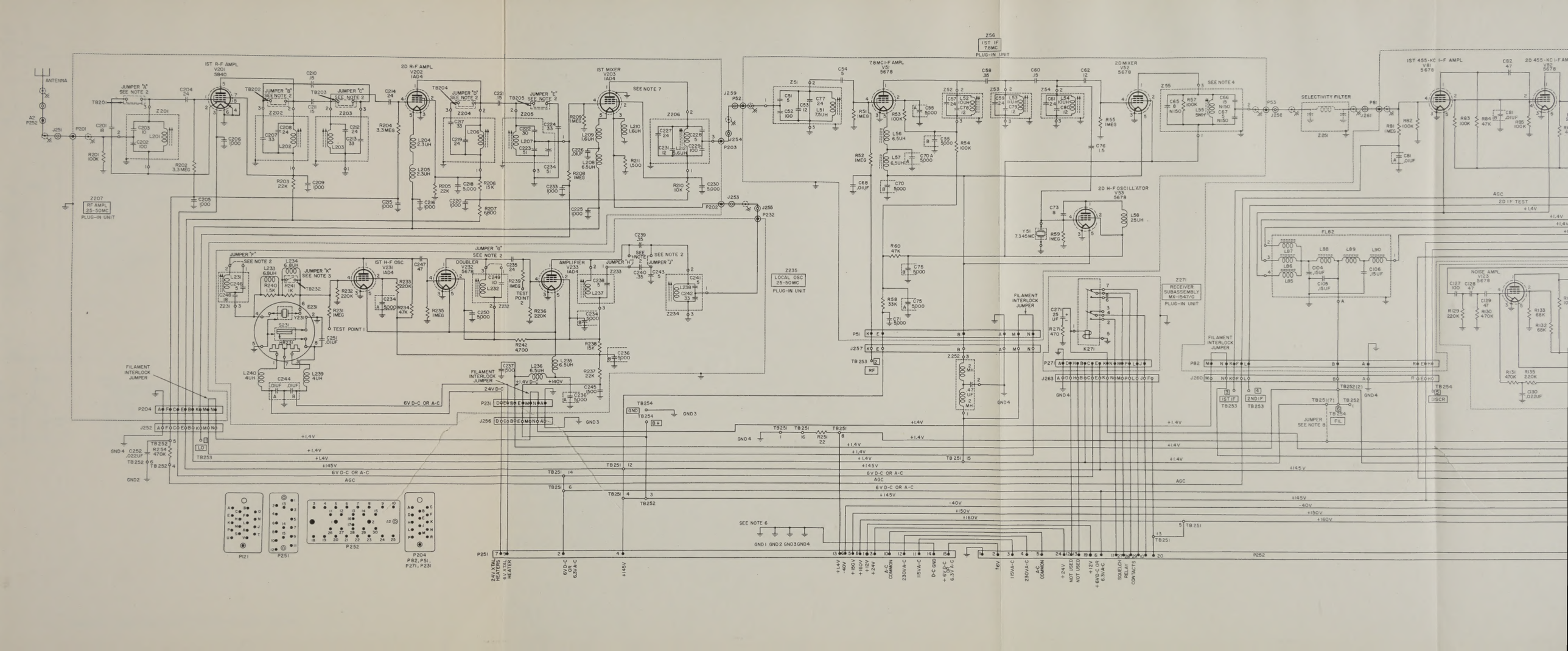
Page 107. Fig. 62 (fold-in). Delete figure 62 and substitute the new figure 62.



NOTES:

1. UNLESS OTHERWISE SHOWN:
   ALL CAPACITORS ARE IN UUF;
   ALL RESISTORS ARE IN OHMS.
2. CONNECT JUMPERS A,B,C,D,E,F,G,H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB 251 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND1, GND2, GND 3, AND GND 4 DENOTES SPECIFIC GROUND CONNECTIONS IN RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING ON THE TUBE TO PIN 3 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE.
8. JUMPER CONNECTION BETWEEN TERMINALS 7 AND 8 OF TB251 IS USED FOR OPERATION WITH POWER SUPPLY PP-846/U.

TM 225-50


ANTENNA
A2
P252
J251
P201
TB201
JUMPER "A"
SEE NOTE 2
Z201
C203
L201
C202
100
C201
18
R201
100K
C204
24
1ST R-F AMPL
V201
5840
TB202
JUMPER "B"
SEE NOTE 2
Z202
C208
24
C207
33
L202
C210
15
TB203
JUMPER "C"
SEE NOTE 2
Z203
C212
24
C213
33
L203
C211
15
C214
24
2D R-F AMPL
V202
IA04
TB204
JUMPER "D"
SEE NOTE 2
Z204
C217
33
C219
24
L206
C218
5,000
C220
1000
C221
15
TB205
JUMPER "E"
SEE NOTE 2
Z205
C222
30
C224
33
C223
51
C234
51
C233
1000
R204
3.3MEG
L204
2.3UH
L205
2.3UH
R205
22K
C216
1000
R206
15K
R207
6800
C215
1000
C225
1000
C209
1000
C206
1000
R203
22K
C205
1000
R202
3.3MEG
Z207
RF AMPL
25-50MC
PLUG-IN UNIT
IST MIXER
V203
IA04
SEE NOTE 7
L210
1.6UH
R211
1,500
L209
1.6UH
L208
.01UF
R208
IMEG
C226
.01UF
C232
5,000
Z206
C227
24
C231
12
L212
5.6UH
C228
5
C229
100
R210
10K
C230
5,000
J259
P52
J254
P203
J253
P202
J255
P232
Z51
C51
5
C52
100
C53
12
C77
24
L51
.75UH
C54
5
78MC I-F AMPL
V51
5678
R51
IMEG
R53
100K
L56
6.5UH
L57
6.5UH
C55
5000
C70A
5000
R52
IMEG
R54
100K
C68
.01UF
C70
5000
Z56
1ST IF
7.8MC
PLUG-IN UNIT
C58
.35
C60
.15
C62
12
Z52
C57
24
L52
.01UH
C79
12
Z53
C59
24
L53
.01UH
C78
12
Z54
C61
24
L54
.01UH
C80
12
2D MIXER
V52
5678
R55
IMEG
C76
.15
Z55
SEE NOTE 4
C65
8
N150
R57
100K
L55
.5MH
C66
.15
N150
C67
5
N150
SELECTIVITY FILTER
Z251
P53
J256
P81
J261
1ST 455-KC I-F AMPL
V81
5678
C82
47
2D 455-KC I-F AMPL
V82
5678
R82
100K
R83
100K
R84
47K
R85
100K
C81
.01UF
R81
IMEG
AGC
2D IF TEST
+1.4V
2D H-F OSCILLATOR
V53
5678
L58
.25UH
Y51
7345KC
R59
IMEG
C73
8
R60
47K
C75
5000
R58
33K
C71
5000
FILAMENT
INTERLOCK
JUMPER
P51
J257
TB253
RF
Z252
2
MH.
47
UF
2
MH.
GND4
Z271
RECEIVER
SUBASSEMBLY
MX-1547/G
PLUG-IN UNIT
C271
25
UF
R271
470
K271
P271
J263
J260
P82
FL82
L87
L86
L88
L89
L90
L85
C104
.05UF
C105
.05UF
C106
.05UF
NOISE AMPL
V123
5678
C127
100
C128
47
C129
47
R129
220K
R130
470K
R133
68K
R132
68K
R131
470K
R135
220K
C130
.022UF
TB254
OSCR
TB252(2)
TB251(7)
TB252
TB254
FIL
JUMPER
SEE NOTE 8
TB253
1ST IF
TB253
2ND IF
JUMPER "F"
SEE NOTE 2
L234
6.8UH
L233
6.8UH
L231
C246
5
C248
18
Z231
JUMPER "K"
SEE NOTE 3
R240
150
R241
1K
TB232
E231
Y231
R231
IMEG
TEST POINT 1
C251
.01UF
IST H-F OSC
V231
IA04
C247
47
R232
220K
R233
220K
C234
A
5000
R234
47K
R235
IMEG
DOUBLER
V232
5678
C235
24
C249
10
L232
C250
5000
R239
IMEG
TEST
POINT
2
Z232
R236
220K
AMPLIFIER
V233
IA04
C236
5
L237
Z233
C240
.35
C243
5
JUMPER "H"
JUMPER "J"
SEE NOTE 2
C239
.35
SEE NOTE
C241
5
C238
5
C242
33
Z234
R242
4700
R238
15K
C236
B
5000
C234
5000
L235
6.5UH
L236
6.5UH
C237
5000
R237
22K
C245
.500
C236
A
5000
L240
4UH
C244
.01UF
.01UF
L239
4UH
FILAMENT
INTERLOCK
JUMPER
JUMPER "G"
SEE NOTE 2
Z235
LOCAL OSC
25-50MC
PLUG-IN UNIT
P204
J252
TB253
LO
TB252
C252
.022UF
R254
470K
GND2
GND4
GND3
+1.4V
+145V
6V D-C OR A-C
AGC
24V D-C
+40V
+150V
+160V
SEE NOTE 6
TB254
GND
B+
TB251
R251
22
P231
J256
P121
P251
P252
P204
P82, P51, P271, P231
24V XTAL HEATERS
6V XTAL HEATER
6V D-C OR 6.3V A-C
+145V
+1.4V
-40V
+150V
+160V
+12V
+24V
A-C COMMON
230V A-C
115V A-C
D-C GND
+6V D-C OR 6.3V A-C
+6V
115V A-C
230V A-C
A-C COMMON
+24V
NOT USED
NOT USED
+12V
+6V D-C OR 6.3V A-C
SQUELCH RELAY CONTACTS

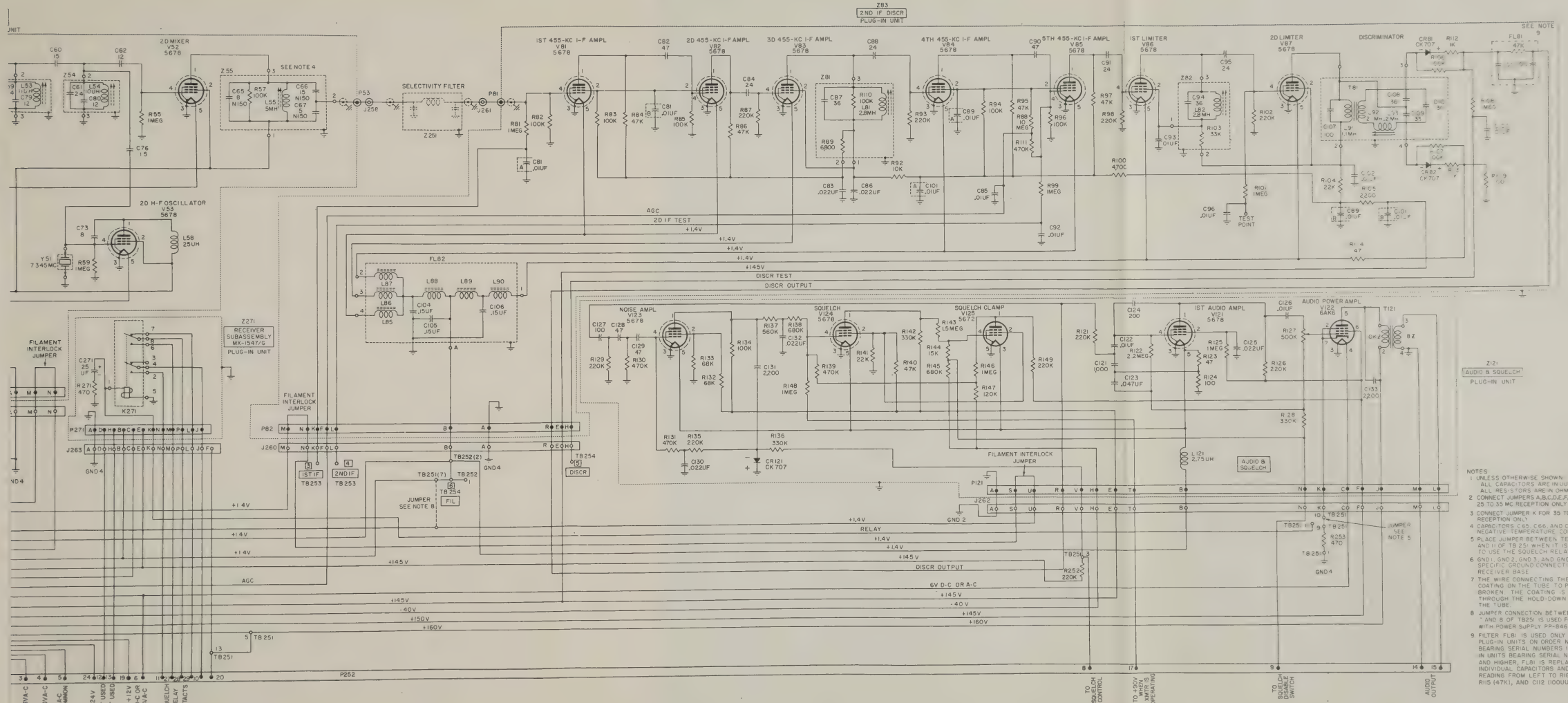
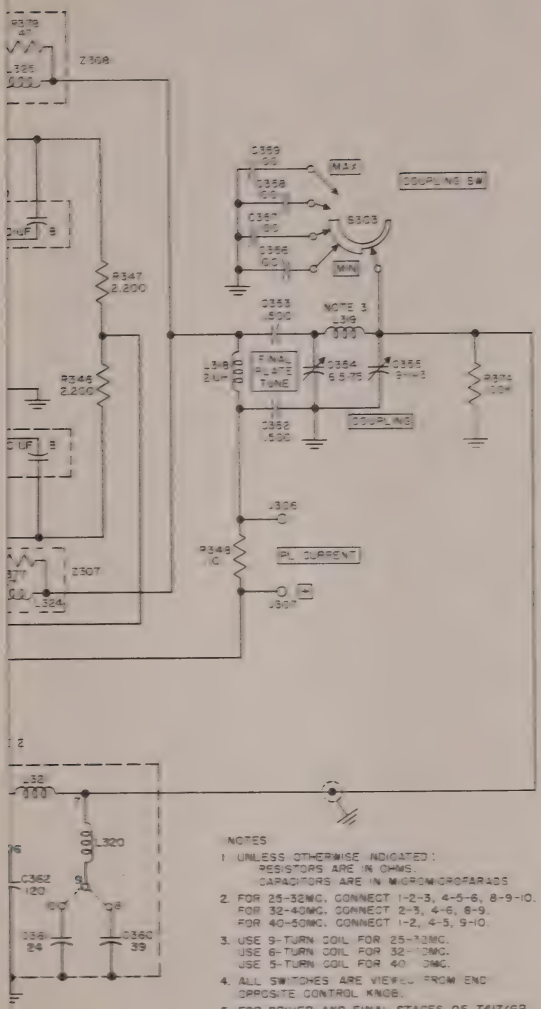


Figure 61.2. Radio Receiver R-257/U, schematic diagram (applies to Radio Receiver R-257/U units using AUDIO & SQUELCH plug-in subassemblies with serial numbers 1214 and higher).

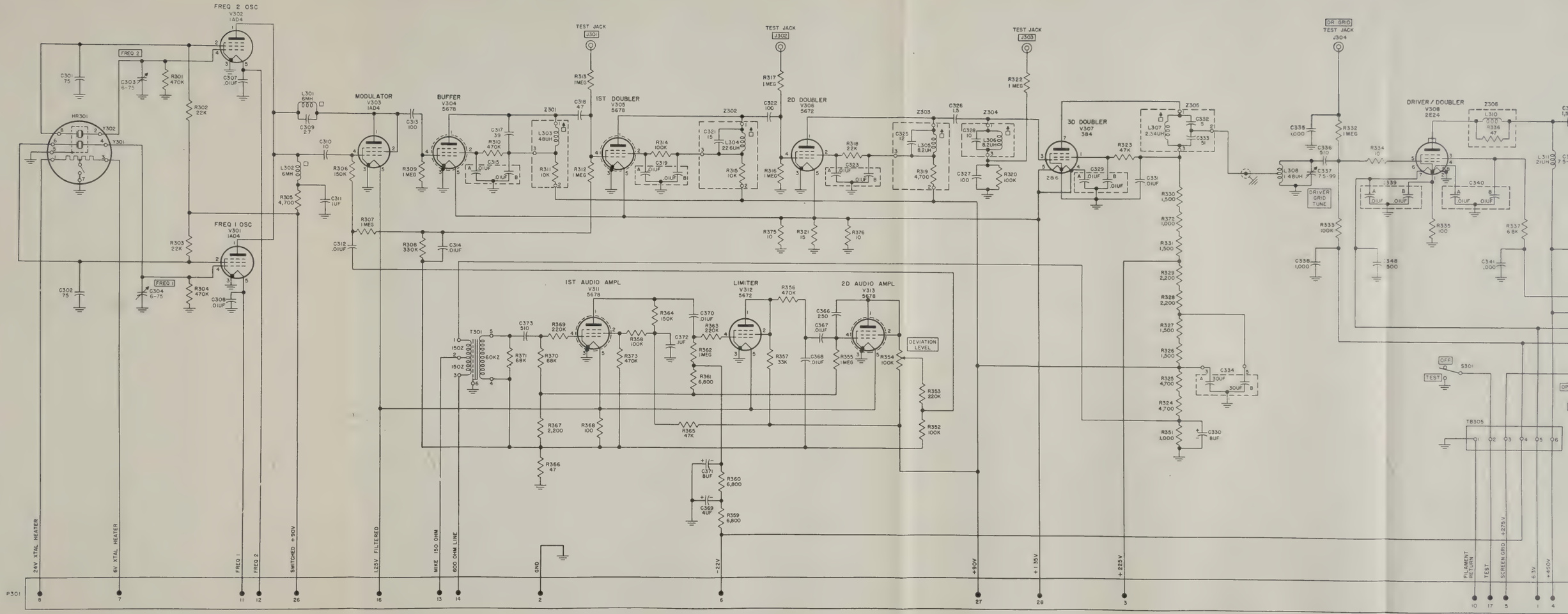
NOTES:
1. UNLESS OTHERWISE SHOWN: ALL CAPACITORS ARE IN UUF, ALL RESISTORS ARE IN OHMS.
2. CONNECT JUMPERS A,B,C,D,E,F,G,H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB 251 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND1, GND2, GND3, AND GND A DENOTES SPECIFIC GROUND CONNECTIONS IN RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING ON THE TUBE TO PIN 3 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE.
8. JUMPER CONNECTION BETWEEN TERMINALS 7 AND 8 OF TB251 IS USED FOR OPERATION WITH POWER SUPPLY PP-846/U.
9. FILTER FL81 IS USED ONLY IN 2ND I F DISCR PLUG-IN UNITS ON ORDER NO 11661-P-52 BEARING SERIAL NUMBERS 1 THROUGH 5550. IN UNITS BEARING SERIAL NUMBERS 5551 AND HIGHER, FL81 IS REPLACED BY INDIVIDUAL CAPACITORS AND A RESISTOR, READING FROM LEFT TO RIGHT, C111 (1500UUF), R115 (47K), AND C112 (1000UUF).



NOTES

1. UNLESS OTHERWISE INDICATED:
   RESISTORS ARE IN OHMS.
   CAPACITORS ARE IN MICROMICROFARADS
2. FOR 25-32MC, CONNECT 1-2-3, 4-5-6, 8-9-10.
   FOR 32-40MC, CONNECT 2-3, 4-6, 8-9.
   FOR 40-50MC, CONNECT 1-2, 4-5, 9-10.
3. USE 9-TURN COIL FOR 25-32MC.
   USE 6-TURN COIL FOR 32-40MC.
   USE 5-TURN COIL FOR 40-50MC.
4. ALL SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB.
5. FOR DRIVER AND FINAL STAGES OF T4I7/GR SEE FIGURE TM804-30.

TM 804-102


FREQ 2 OSC
V302
1AD4
FREQ 2
C301 75
C303 6-75
R301 470K
R302 22K
C307 .01UF
HR301
Y302
Y301
FREQ 1 OSC
V301
1AD4
FREQ 1
R303 22K
R304 470K
C302 75
C304 6-75
C308 .01UF
L301 6MH
C309 27
L302 6MH
R305 4,700
C311 1UF
MODULATOR
V303
1AD4
C310 10
R306 150K
R307 1MEG
C312 .01UF
C313 100
R308 330K
C314 .01UF
BUFFER
V304
5678
R309 1MEG
C317 39
R310 470K
C315 .01UF
R311 10K
Z301
L303 48UH
TEST JACK
J301
R313 1MEG
C318 47
1ST DOUBLER
V305
5678
R312 1MEG
R314 100K
C319 .01UF
Z302
C321 15
L304 226UH
TEST JACK
J302
R317 1MEG
C322 100
2D DOUBLER
V306
5672
R315 10K
R316 1MEG
R318 22K
C323 .01UF
Z303
C325 12
L305 8.2UH
C326 1.5
Z304
C328 10
L306 8.2UH
C327 100
R319 4,700
R320 100K
TEST JACK
J303
R322 1 MEG
3D DOUBLER
V307
384
Z305
L307 2.34UH
C332 5
C333 51
R323 47K
C329 .01UF
C331 .01UF
DR GRID
TEST JACK
J304
DRIVER / DOUBLER
V308
2E24
Z306
L310 .300
C336 47
C335 1,000
R332 1MEG
C336 510
R334 10
C337 7.5-99
DRIVER GRID TUNE
L308 48UH
R333 100K
C338 1,000
C339 .01UF .01UF
C340 .01UF .01UF
R335 100
C348 500
C341 .1000
R337 6.8K
L311 21UH
R330 1,500
R372 1,000
R331 1,500
R329 2,200
R328 2,200
R327 1,500
R326 1,500
R325 4,700
R324 4,700
R351 1,000
C334 30UF 30UF
C330 8UF
1ST AUDIO AMPL
V311
5678
LIMITER
V312
5672
2D AUDIO AMPL
V313
5678
T301
150Z
150Z
60KZ
C373 510
R369 220K
R371 68K
R370 68K
R373 470K
R364 150K
C370 .01UF
C372 .1UF
R363 220K
R362 1MEG
R361 6,800
R356 470K
R357 33K
C366 250
C367 .01UF
C368 .01UF
R355 1MEG
R354 100K
DEVIATION LEVEL
R353 220K
R352 100K
R358 100K
R367 2,200
R368 100
R365 47K
R366 47
C371 8UF
C369 4UF
R360 6,800
R359 6,800
OFF
TEST
S301
TB305
24V XTAL HEATER
6V XTAL HEATER
FREQ 1
FREQ 2
SWITCHED +90V
125V FILTERED
MIKE 150 OHM
600 OHM LINE
GND
-22V
+90V
+135V
+225V
FILAMENT RETURN
TEST
SCREEN GRID +275V
6.3V
+450V
P301
8
7
11
12
26
16
13
14
2
6
27
28
3
10
17
5
1
4

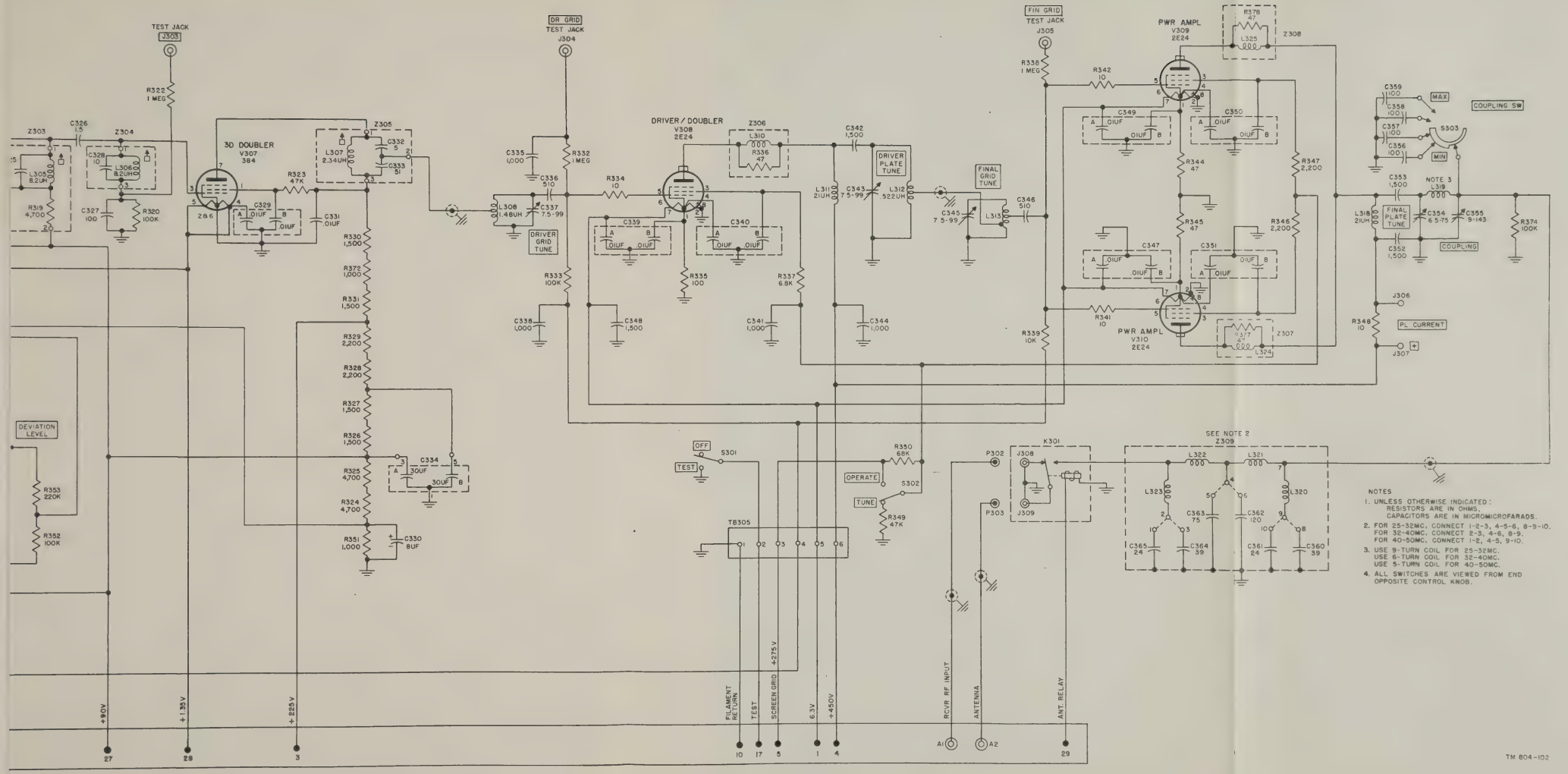


Figure 62. Radio Transmitter T-208/U, schematic diagram.

THIS ADDENDA WILL REMAIN IN EFFECT ONLY UNTIL THE INFORMATION IS PUBLISHED IN AN OFFICIAL DEPARTMENT OF THE ARMY PUBLICATION.

ADDENDA NO. 3
6 JANUARY 1954

ADDENDA NO. 3 TO INSTRUCTION BOOK FOR RADIO SETS AN/VRC-6, -6X, AND -6Y

The following information, published on Order No. 11661–Phila–52, is to be added to the instruction book. This addenda supersedes Addenda No. 1, 14 August 1953, and Addenda No. 2, 12 November 1953.

Personnel using this equipment and having custody of this addenda will enter suitable notations beside each affected paragraph and figure in the instruction book to indicate the presence of this supplementary information.

Page VIII. Contents. Delete Appendix II. IDENTIFICATION TABLE OF PARTS.

Change "Electrical Equipment Cabinet CY–938/VRC" to read: Electrical Equipment Cabinet CY–938A/VRC, wherever it appears in the instruction book.

Page 1. Par. 1a. Delete the last sentence and substitute the following: In addition to this information, Appendix I covers a list of references.

Page 2. Par. 5. Make the following changes:

In item 5, line 1, change "15-kc" to read: 18-kc.

In item 5, line 2, change "15 kc" to read: 18 kc.

Page 3. Par. 6. In item 5, change "15-kc" to read: 18-kc.

Page 8. Par. 10. Change the information for the ninth item as follows:

Component	Radio Set AN/VRC-6Y	Radio Set AN/VRC-6X	Radio Set AN/VRC-6	Dimensions of components				
				Height (in.)	Depth (in.)	Length (in.)	Volume (cu ft)	Weight (lb.)
Electrical Equipment Cabinet CY–938A/VRC (with hardware)	1	1	1	16½	10½	19 5/16	1.05	33

Page 9. Par. 11. Line 11. Change "provided on the side" to read: provided on the left side.

Page 9. Par. 11. Line 12. Add the following after "the control cable": An alternate battery cable entrance hole is provided on the right side.

Page 16. Par. 20. Delete the second sentence and substitute the following: The resistance of the carbon button microphone is 40 ohms, and the impedance of the receiver is 300 ohms.

Page 17. Par. 22. In the chart, delete the third item (Tube, electron type 5783) entirely.

Page 18. Par. 22. Add the following to the list of running spares:

Item	Equipment		
	Radio Set AN/VRC-6Y	Radio Set AN/VRC-6X	Radio Set AN/VRC-6
Handset holder	1	1	1

Page 20. Par. 26b(3). Add the following sentence:

If this entrance hole is not convenient, use the hole provided on the right side of the equipment cabinet.

Page 26. Par. 27d. Delete the last sentence.

Page 26. Par. 27e. Line 3. Change "the six screws" to read: the eight screws.

Page 35. Table II. Adjustment column. Tenth line. Add the following after "reading is obtained":

Place the TUNE-OPERATE switch S302 in the OPERATE position.

Page 46. Fig. 32. On the "AUDIO AND SQUELCH PLUG-IN UNIT", change "AUDIO OUTPUT" to read: AUDIO POWER AMPL.

Page 53. Fig. 36. On V122 stage, change "AUDIO OUTPUT" to read: AUDIO POWER AMPL.

Page 60. Fig. 42. Make the following changes in figure 42: Change "6V" on terminal 7 of TB1501 to read: 1.25V.

Add a terminal 3 to terminal board TB1501.

Add the following to the notes:

4. ON RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 496 AND HIGHER, TERMINAL 3 ON TERMINAL BOARD TB1501 IS CONNECTED TO PIN K OF JACK J1501.

5. FOR ALL RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 601 AND HIGHER, ADD A JUMPER BETWEEN PINS E AND H OF JACK J1501, DELETE THE LEAD BETWEEN TERMINAL 19 OF TB1502 AND PIN D OF JACK J1501, AND REVERSE THE NUMBERS ON PINS 19 AND 20 AND TRANSPOSE TERMINALS 11 AND 12 OF TB1502.

Page 61. Par. 67b. Delete subparagraph (3) and substitute the following:

(3) *Transmitter audio.* On Radio Set Control C–847/U units with serial numbers from 1 to 600, the output of the handset microphone is taken from the control unit through terminals C and D of J1501 and terminals 19 and 20 of TB1502. On Radio Set Control C–847/U units with serial numbers of 601 and higher, the output of the handset microphone is taken from the control unit through terminals C and E of J1501 and terminal 19 of TB1502 and ground (fig. 45.1). Refer to paragraph 69 for more information concerning the connections between the microphone and transmitter.

Page 61. Fig. 43. Make the following changes in figure 43:

Change "AUDIO OUTPUT" on V122 to read:

AUDIO POWER AMPL.

Add the following to the notes:

4. FOR ALL RADIO SET CONTROLS C–847/U WITH SERIAL NUMBERS 601 AND HIGHER: TRANSPOSE TERMINALS 11 AND 12 ON TB1502; DELETE THE LEAD CONNECTING FROM TERMINAL 12 OF TB805 TO THE NEW TERMINAL 11 OF TB1502; DELETE THE LEAD CONNECTING TERMINAL 11 OF TB805 TO THE NEW TERMINAL 12 OF TB1502; CONNECT TERMINAL 12 OF TB805 TO THE NEW TERMINAL 12 OF TB1502; CONNECT TERMINAL 11 OF TB805 TO THE NEW TERMINAL 11 OF TB1502.

Page 62. Fig. 44. Add the following note to figure 44:

NOTE: FOR RADIO SET CONTROL C–847/U UNITS WITH SERIAL NUMBERS 601 OR HIGHER, TRANSPOSE TERMINALS 11 AND 12 ON TB1502 IN ALL EIGHT PLACES WHERE THEY APPEAR.

Page 63. Par. 67b(4). Line 2. Change "less" to read: more.

Page 65. Fig. 45. Add the following to the figure title: *(Applies to Radio Set Control C–847/U units with serial numbers from 1 to 600.)*

Page 65. Fig. 45. Insert figure 45.1 after figure 45.

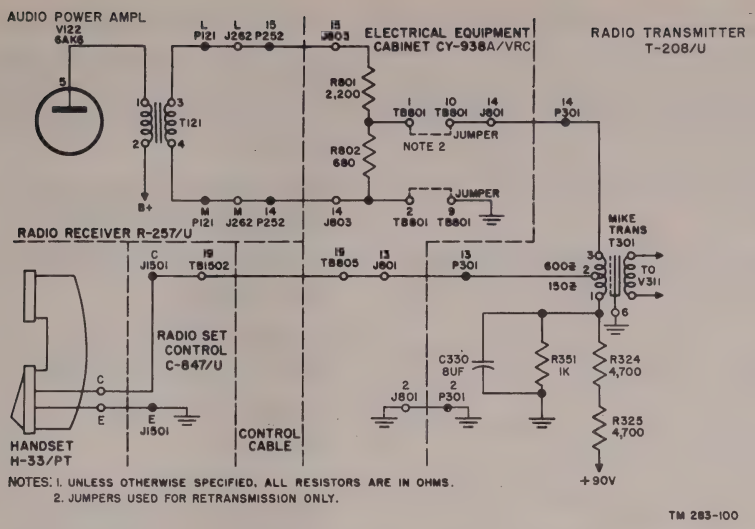


Figure 45.1. Microphone and retransmission audio circuits (applies to Radio Set Control C–847/U units with serial numbers 601 and higher).

Page 65. Fig. 46. Add the following to the notes:

3. FOR AUDIO & SQUELCH PLUG-IN SUBASSEMBLIES WITH SERIAL NUMBERS 1214 AND HIGHER, CHANGE THE VALUE OF R142 FROM 470K TO 330K. ALL RADIO RECEIVER R–257/U UNITS ARE SHIPPED FROM THE FACTORY EQUIPPED WITH THESE MODIFIED AUDIO & SQUELCH SUBASSEMBLIES.

Page 66. Par. 71b. Line 11. Change "L241" to read: L239.

Page 67. Par. 73b. Delete the first sentence and substitute the following: Crystal ovens E231 and E301 are operated directly from the 24-volt source.

Pages 81 through 88. Delete Appendix II entirely.

Page 89. Fig. 49 (fold-in). Make the following changes in figure 49:

On the left side of the illustration, delete the connector labeled (P801) and the two leads connecting to J804.

Connect a lead from the center of J804 to the center of P801.

Page 91. Fig. 50 (fold-in). Change "HR301" to read: E301.

Page 93. Fig. 51 (fold-in). Change "HR301" to read: E301.

Page 95. Fig. 52 (fold-in). Make the following changes in figure 52:

Transpose terminals 2 and 7 of RT1301 and RT1302.

Reverse the positions of R1301 and L1301.

Change "J1302" to read: J1306.
Change "J1301" to read: J1305.

Delete the lead running from the junction of RT1302, RT1301, and CR1301 to terminal 5 of K1301.

Add resistor R1313 (40 ohms) from terminal 7 to terminal 5 of K1301.

Add the following to the notes:

8. IN DYNAMOTOR-POWER SUPPLY DY–98/G UNITS ON ORDER NO. 11661–P–52 BEARING SERIAL NUMBERS ABOVE 1200, RESISTOR R1301 IS DELETED.

Page 99. Fig. 55. Make the following changes in figure 55:

Transpose terminals 5 and 6 on relay K1201.
Transpose terminals 1 and 9 on relay K1203.

Page 100. Fig. 56. Make the following changes in figure 56:

Transpose terminals 4 and 6 on relay K3103.
Transpose terminals 1 and 9 on relay K3103.

Page 101. Fig. 57. Make the following changes in figure 57:

Delete the lead connecting terminal 5 of K1301 and terminal 2 of RT1302.

Add resistor R1313 (40 ohms) between terminals 5 and 7 of K1301.

Add the following to the notes:

6. IN DYNAMOTOR - POWER SUPPLY DY–98/G UNITS ON ORDER NO. 11661–P–52 BEARING SERIAL NUMBERS ABOVE 1200, RESISTOR R1301 IS DELETED.

Page 102. Fig. 58. In the figure title, change "PP–869/G" to read: PP–869/U.

Page 103. Fig. 59. Delete figure 59 and insert new figure 59.

Page 104. Fig. 60. Add the reference symbol G2901 to the vibrator shown in the figure.

Page 105. Fig. 61 (fold-in). Add figure 61.2 after figure 61.

Page 107. Fig. 62 (fold-in). Delete figure 62 and substitute the new figure 62.

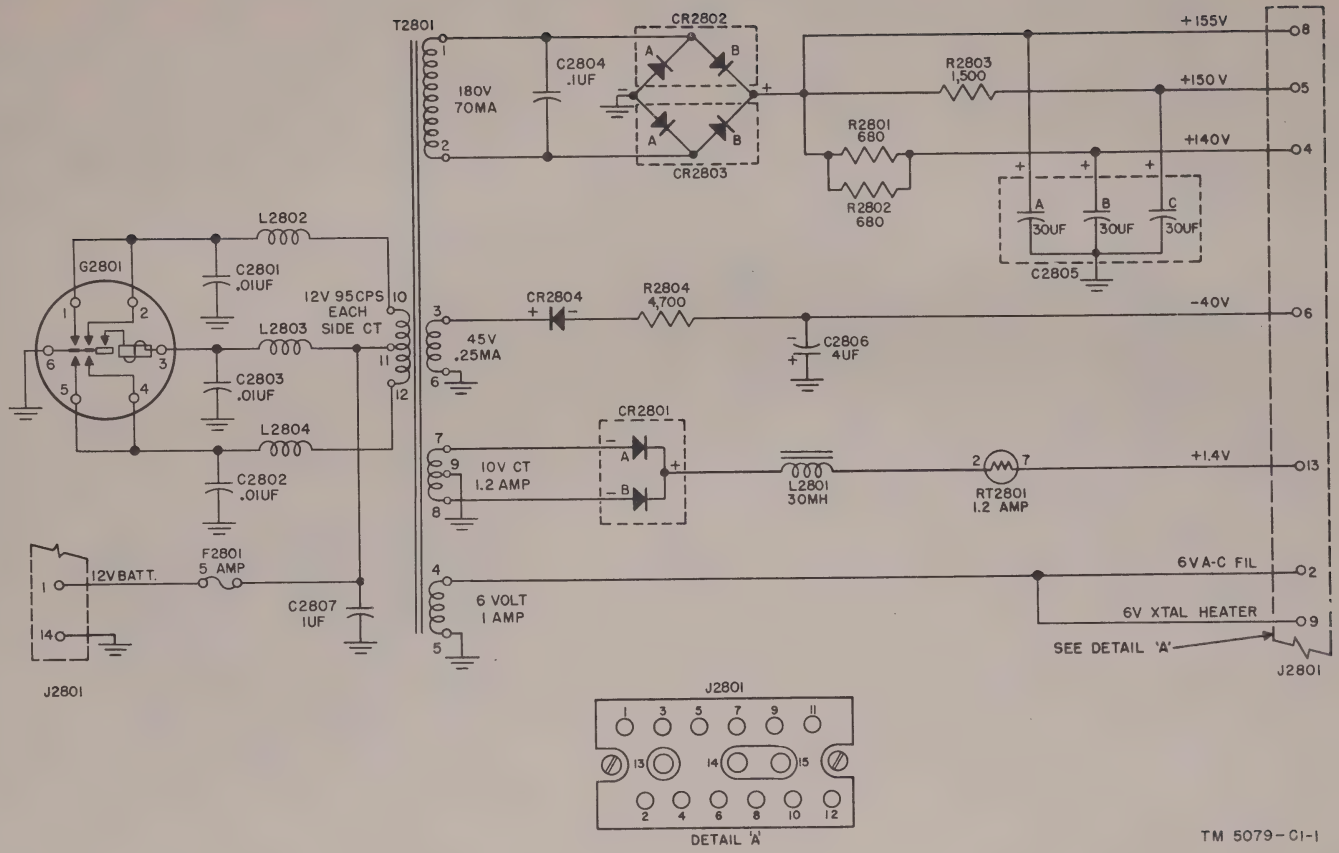
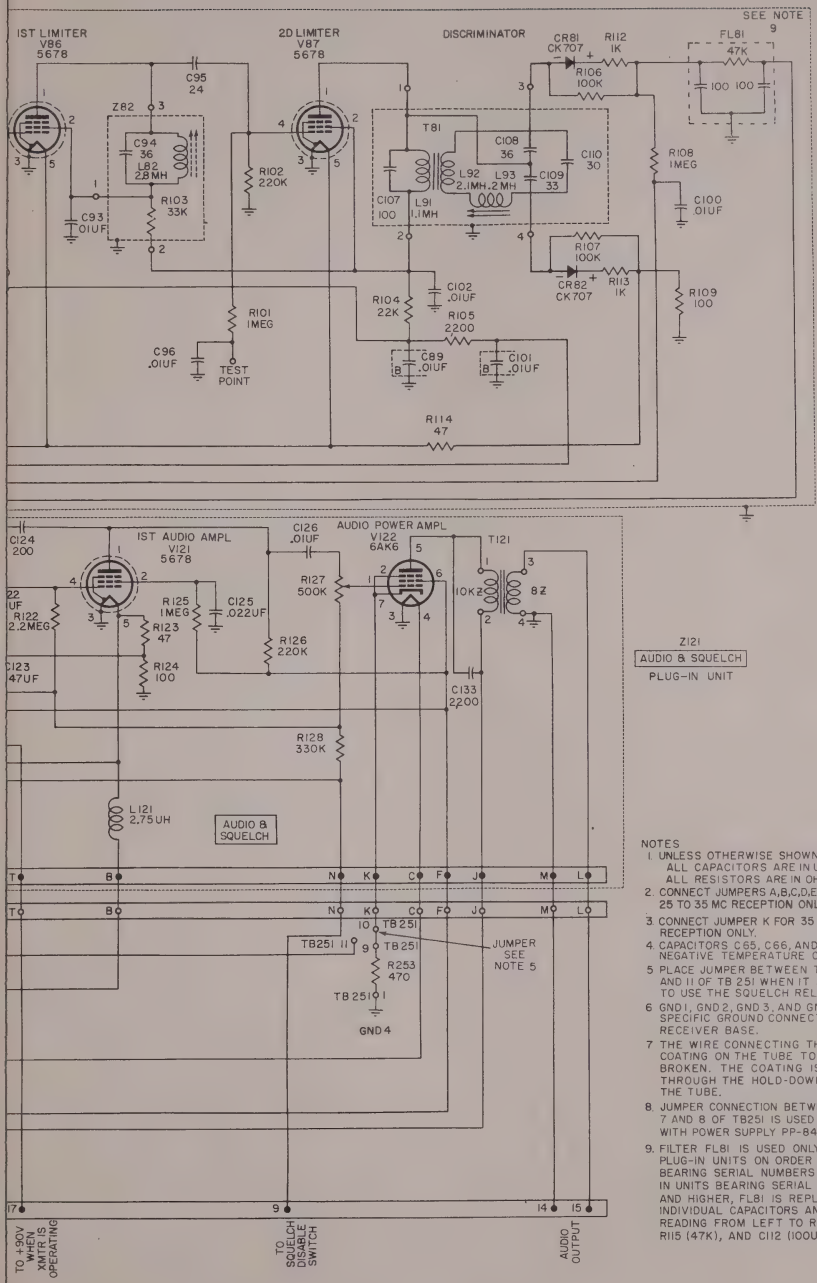


Figure 59. Power Supply PP–868/U, schematic diagram (12-volt).



NOTES

1. UNLESS OTHERWISE SHOWN:
   ALL CAPACITORS ARE IN UUF;
   ALL RESISTORS ARE IN OHMS.
2. CONNECT JUMPERS A,B,C,D,E,F,G,H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB 251 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND1, GND2, GND3, AND GND 4 DENOTES SPECIFIC GROUND CONNECTIONS IN RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING ON THE TUBE TO PIN 3 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE.
8. JUMPER CONNECTION BETWEEN TERMINALS 7 AND 8 OF TB251 IS USED FOR OPERATION WITH POWER SUPPLY PP-846/U.
9. FILTER FL81 IS USED ONLY IN 2ND I-F DISCR PLUG-IN UNITS ON ORDER NO.11681-P-52 BEARING SERIAL NUMBERS 1 THROUGH 5550. IN UNITS BEARING SERIAL NUMBERS 5551 AND HIGHER, FL81 IS REPLACED BY INDIVIDUAL CAPACITORS AND A RESISTOR, READING FROM LEFT TO RIGHT, C111 (150UUF), R115 (47K), AND C112 (100UUF).

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e 61.2. Radio Receiver R-257/U, schematic diagram (applies to Radio Receiver R-257/U units using AUDIO & SQUELCH plug-in subassemblies with serial numbers 1214 and higher).

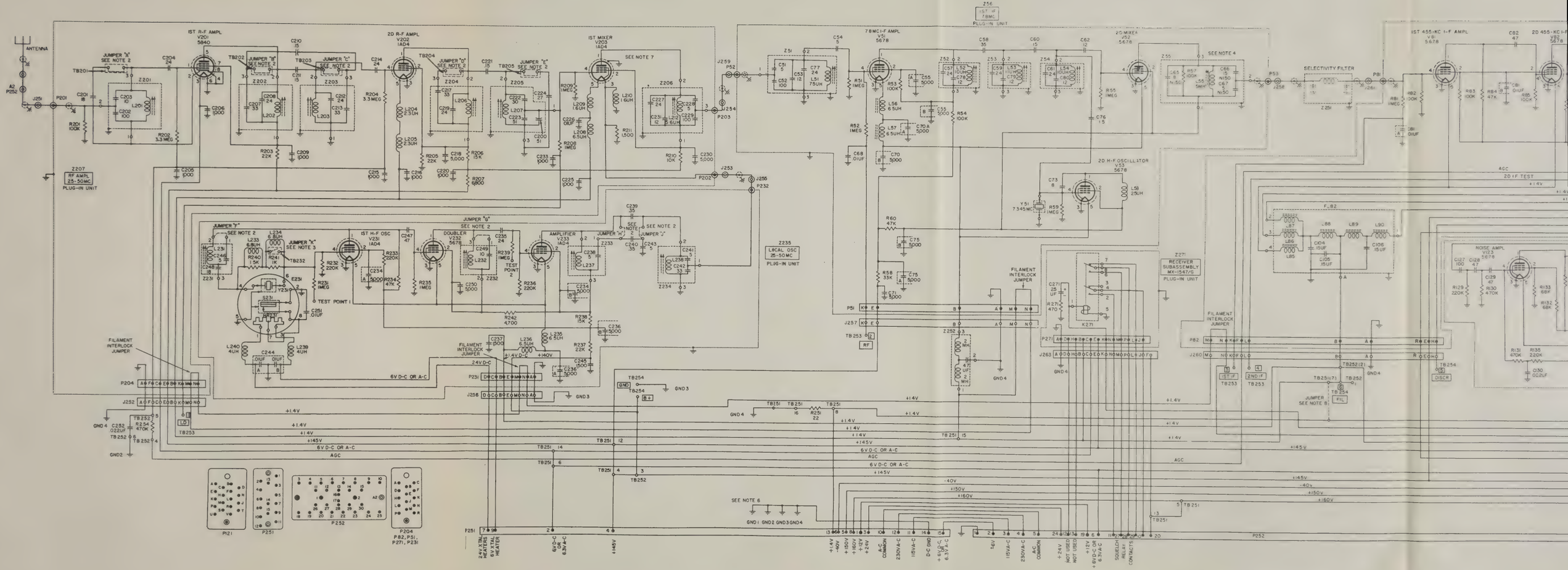
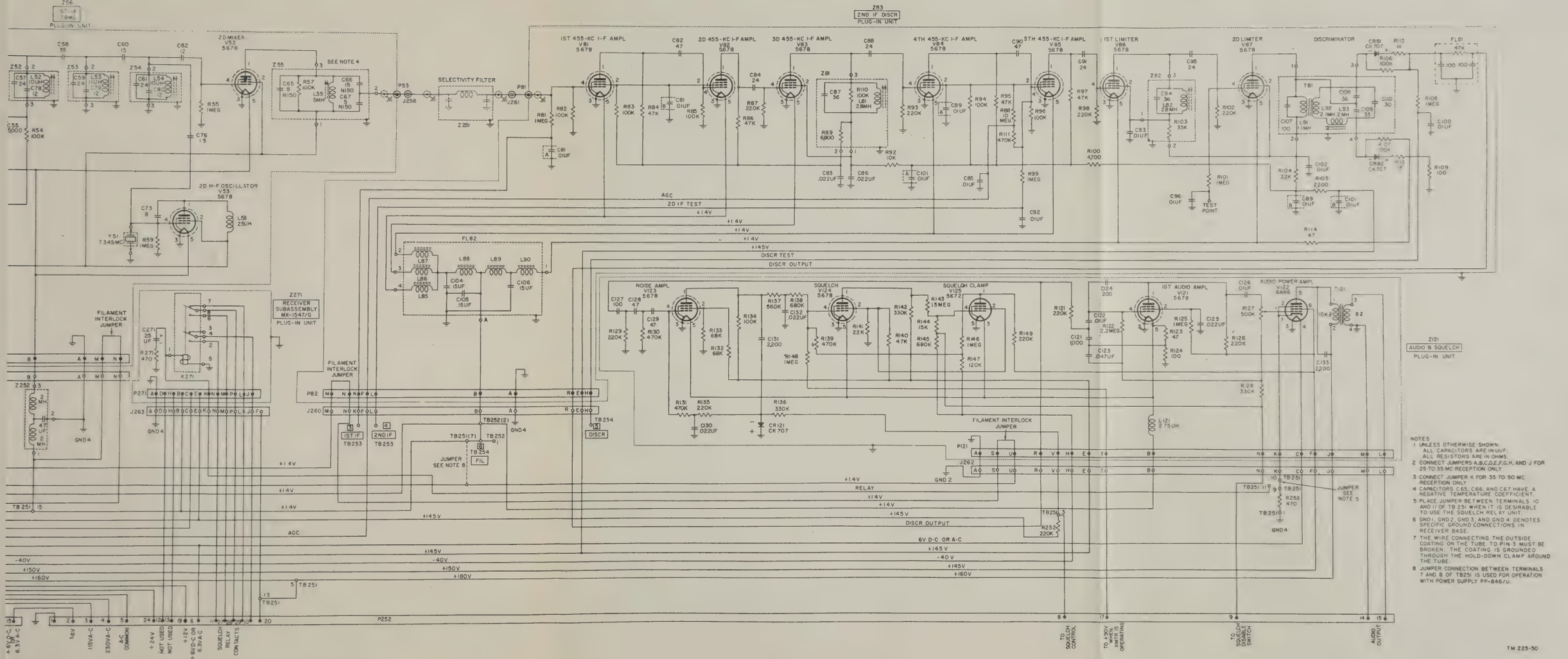
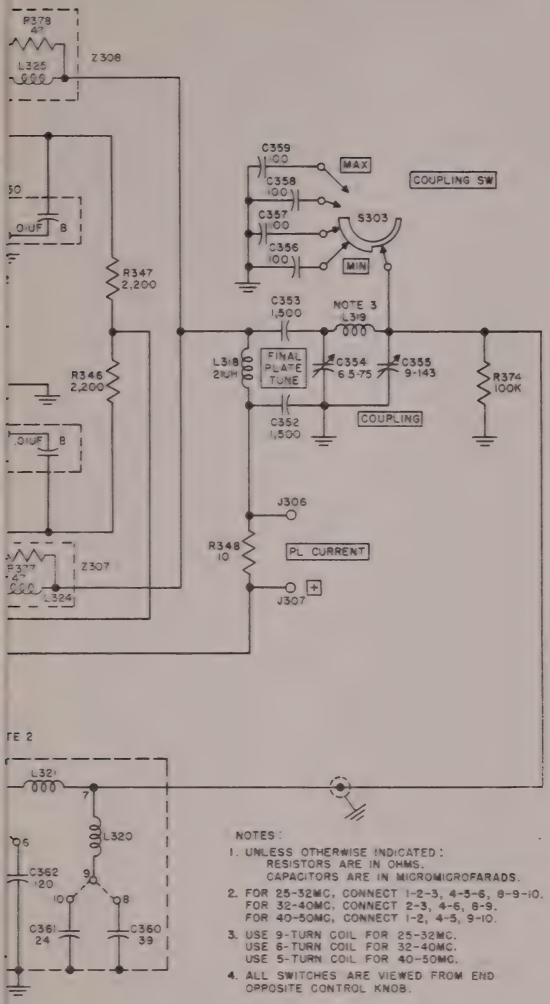


Figure 61.1. Radio Receiver R–257/U, schematic diagram (applies to Radio Receiver R–257/U units using AUDIO & SQUELCH plug-in subassemblies with serial numbers 1214 and higher).



NOTES
1. UNLESS OTHERWISE SHOWN: ALL CAPACITORS ARE IN UUF; ALL RESISTORS ARE IN OHMS.
2. CONNECT JUMPERS A,B,C,D,E,F,G,H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB 251 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND1, GND2, GND3, AND GND4 DENOTES SPECIFIC GROUND CONNECTIONS IN RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING ON THE TUBE TO PIN 3 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE.
8. JUMPER CONNECTION BETWEEN TERMINALS 7 AND 8 OF TB251 IS USED FOR OPERATION WITH POWER SUPPLY PP-846/U.

Figure 61.1. Radio Receiver R–257/U, schematic diagram (applies to Radio Receiver R–257/U units using AUDIO & SQUELCH plug-in subassemblies with serial numbers 1214 and higher).



NOTES:

1. UNLESS OTHERWISE INDICATED:
   RESISTORS ARE IN OHMS.
   CAPACITORS ARE IN MICROMICROFARADS.
2. FOR 25-32MC, CONNECT 1-2-3, 4-5-6, 8-9-10.
   FOR 32-40MC, CONNECT 2-3, 4-6, 8-9.
   FOR 40-50MC, CONNECT 1-2, 4-5, 9-10.
3. USE 9-TURN COIL FOR 25-32MC.
   USE 6-TURN COIL FOR 32-40MC.
   USE 5-TURN COIL FOR 40-50MC.
4. ALL SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB.

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Figure 62. Radio Transmitter T-208/U, schematic diagram.

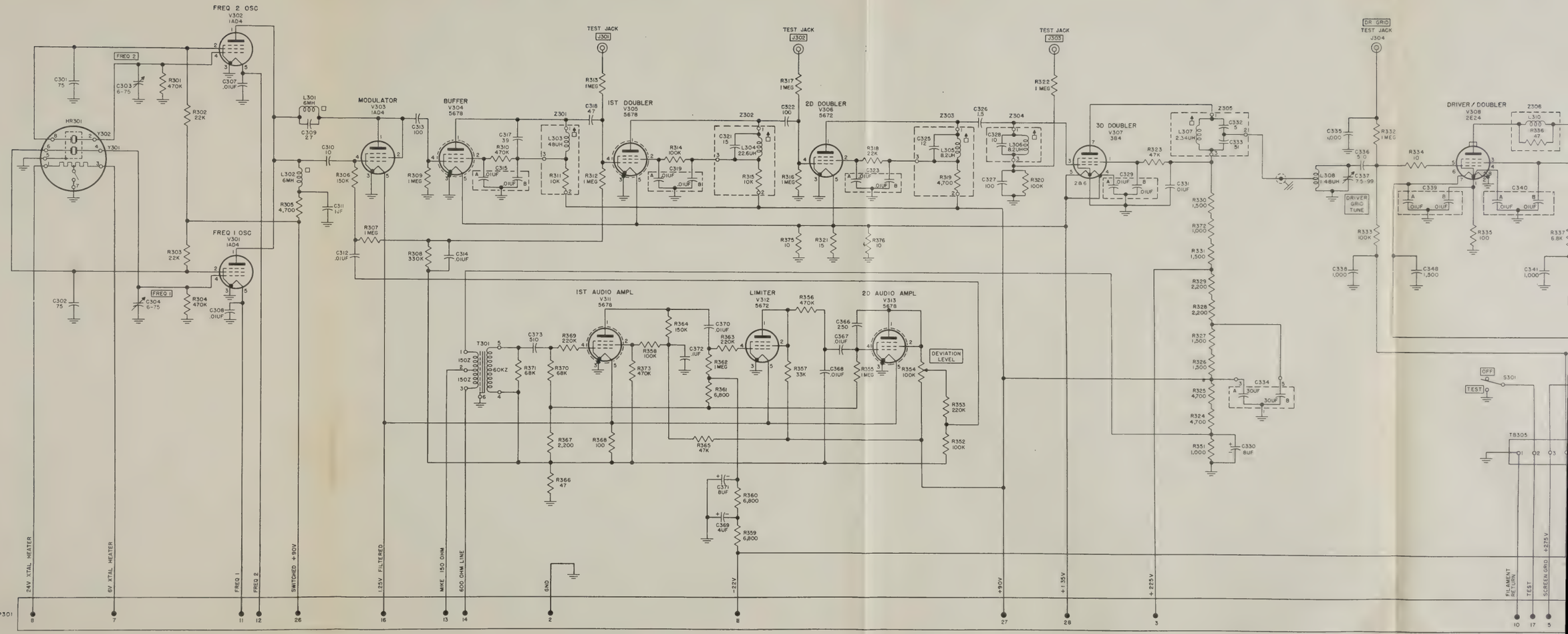
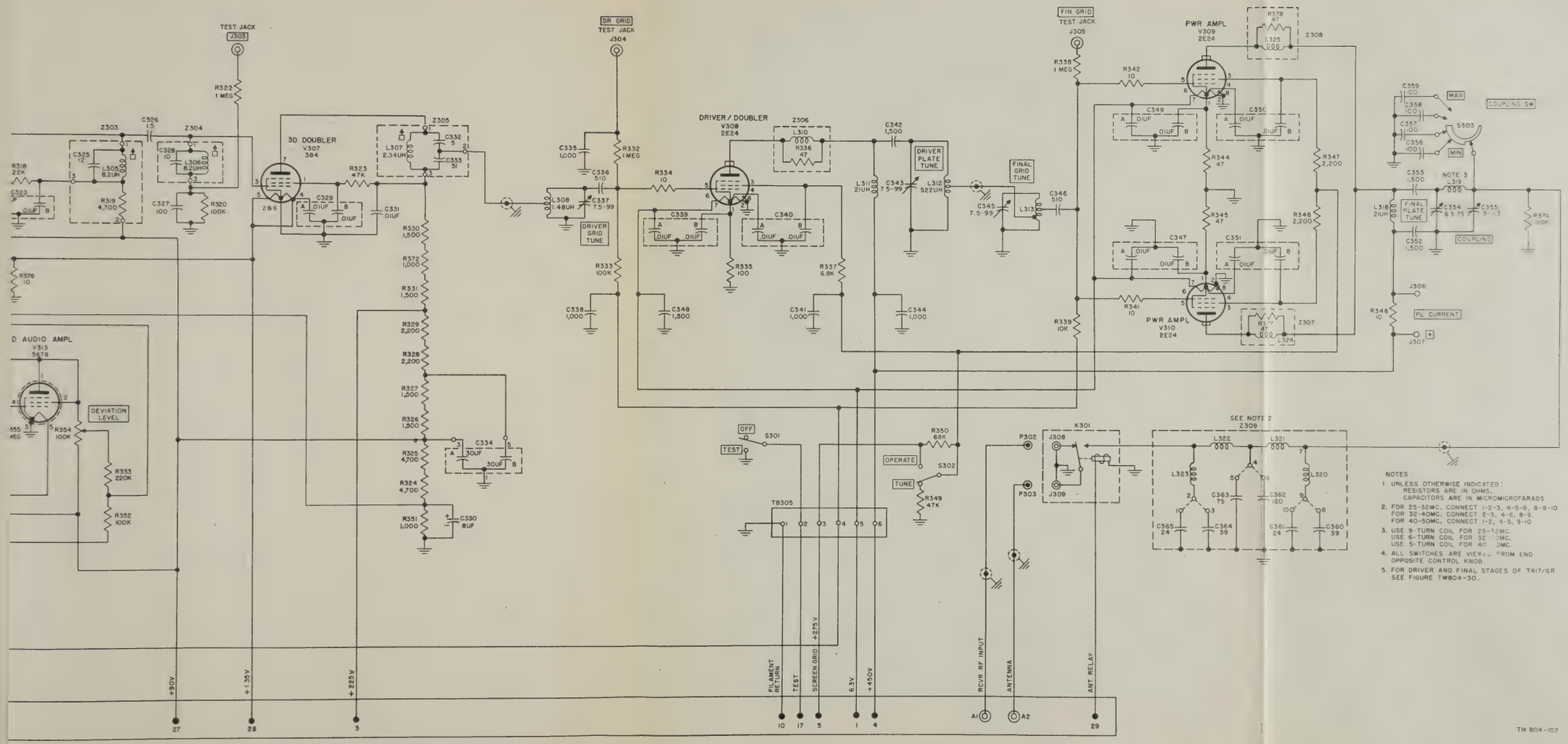


Figure 62. Radio Transmitter T-208/U, schematic diagram.



NOTES
1. UNLESS OTHERWISE INDICATED: RESISTORS ARE IN OHMS, CAPACITORS ARE IN MICROMICROFARADS
2. FOR 25-32MC, CONNECT 1-2-3, 4-5-6, 8-9-10
   FOR 32-40MC, CONNECT 2-3, 4-6, 8-9,
   FOR 40-50MC, CONNECT 1-2, 4-5, 9-10
3. USE 9-TURN COIL FOR 25-32MC.
   USE 6-TURN COIL FOR 32-40MC.
   USE 5-TURN COIL FOR 40-50MC.
4. ALL SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB.
5. FOR DRIVER AND FINAL STAGES OF T417/GR SEE FIGURE TM804-30.

Figure 62. Radio Transmitter T-208/U, schematic diagram.

INSTRUCTION BOOK

FOR

RADIO SETS AN/VRC-6, -6X, and -6Y

MANUFACTURED BY

MOTOROLA INCORPORATED

ORDER NO. 11661-PHILA-52-93

20 MAY 1953

WARNING

HIGH VOLTAGE

is used in the operation
of this equipment.

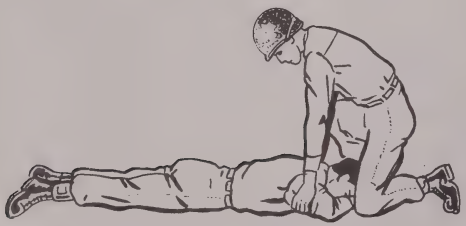
DEATH ON CONTACT

may result if personnel fail
to observe safety precautions.

Be careful not to contact high-voltage connections or input connections when working on or near this equipment. When working inside the equipment, after the power has been turned off, always short-circuit the high-voltage capacitors.

A Position of operator and victim

B Compression phase



C Expansion phase (arm lift)

D Expansion phase (arm release)

TM AR-4

ARTIFICIAL RESPIRATION

GENERAL PRINCIPLES

1. Seconds count! Begin at once! Don't take time to move the victim unless you must. Don't loosen clothes, apply stimulants or try to warm the victim. Start resuscitation! Get air in the lungs! You may save a life!

2. Place the victim's body in a prone position, so that any fluids will drain from the respiratory passages. The head should be extended and turned sideward *never flexed forward;* the chin shouldn't sag, since obstruction of the respiratory passages may occur.

3. Remove any froth or debris from the mouth with your fingers. Draw the victim's tongue forward.

4. Begin artificial respiration. Continue it rhythmically and without any interruption until natural breathing starts or the victim is pronounced dead. Try to keep the rhythm smooth. Split-second timing is not absolutely essential.

5. When the victim starts breathing, or when additional help is available loosen the clothing; remove it, if it's wet; keep the victim warm. Shock should receive adequate attention. Don't interrupt the rhythmical artificial technique for these measures. Do them only when you have help or when natural breathing has started.

6. When the victim is breathing, adjust your timing to assist him. Don't fight his efforts to breathe. Synchronize your efforts with his. After resuscitation, keep him lying down until seen by a physician or until recovery seems certain.

7. Don't wait for mechanical resuscitation! If an approved model is available, use it, but, since mechanical resuscitators are only slightly more effective than properly performed "push-pull" manual technique, *never* delay manual resuscitation for it.

BACK-PRESSURE ARM LIFT METHOD

1. *Position of Victim.* Place the victim in the prone (face-down) position. Bend his elbows; place one hand upon the other. Turn his face to one side, placing his cheek upon his hands.

2. *Position of Operator.* Kneel on your left or right knee, at the victim's head, facing him. Your knee should be at the side of the victim's head close to his forearm, your foot should be near his elbow. Kneel on both knees if you find it more comfortable, with one knee on each side of the head. Place your hands on the flat of the victim's back so that their heels are just below the lower tip of his shoulder blades. With the tip of your thumbs touching spread your fingers downward and outward. (See A)

3. *Compression Phase.* Rock forward until your arms are approximately vertical and allow the weight of the upper part of your body to exert a slow, steady, even, downward pressure upon your hands. This forces air out of the lungs. Keep your elbows straight and press almost directly downward on the back. (See B)

4. *Expansion Phase.* Release the pressure, avoid any finish thrust, and commence to rock backward slowly. Place your arms upon the victim's arms just above the elbows, and draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the victim's shoulders.

Don't bend your elbows. As you rock backward, the victim's arms will be drawn toward you. (The arm lift expands the chest by pulling on the chest muscles, arching the back and relieving the weight on the chest.) Drop the arms gently to the ground or floor. This completes the cycle. (See C and D). Now. repeat the cycle.

5. *Cycle Timing and Rhythm.* Repeat the cycle 10 to 12 times per minute. Use a steady uniform rate of Press, Release, Lift, Release. Longer counts or about equal length should be given to the "Press" and "Lift" steps of the compression and expansion phases. Make the "Release" periods of minimum duration.

6. *Changing Position or Operator.*

(*a*) Remember that you can use either or both knees or can shift knees during the procedure, provided you don't break the rhythm. Observe how you rock forward with the back-pressure and backward with the arm-lift. The rocking motion helps to sustain the rhythm and adds to the ease of operation.

(*b*) If you tire and another person is available, you can "take turns." Be careful not to break the rhythm in changing. Move to one side and let your replacement come in from the other side. Your replacement begins the "Press-Release" after one of the "Lift-Release" phases, as you move away.

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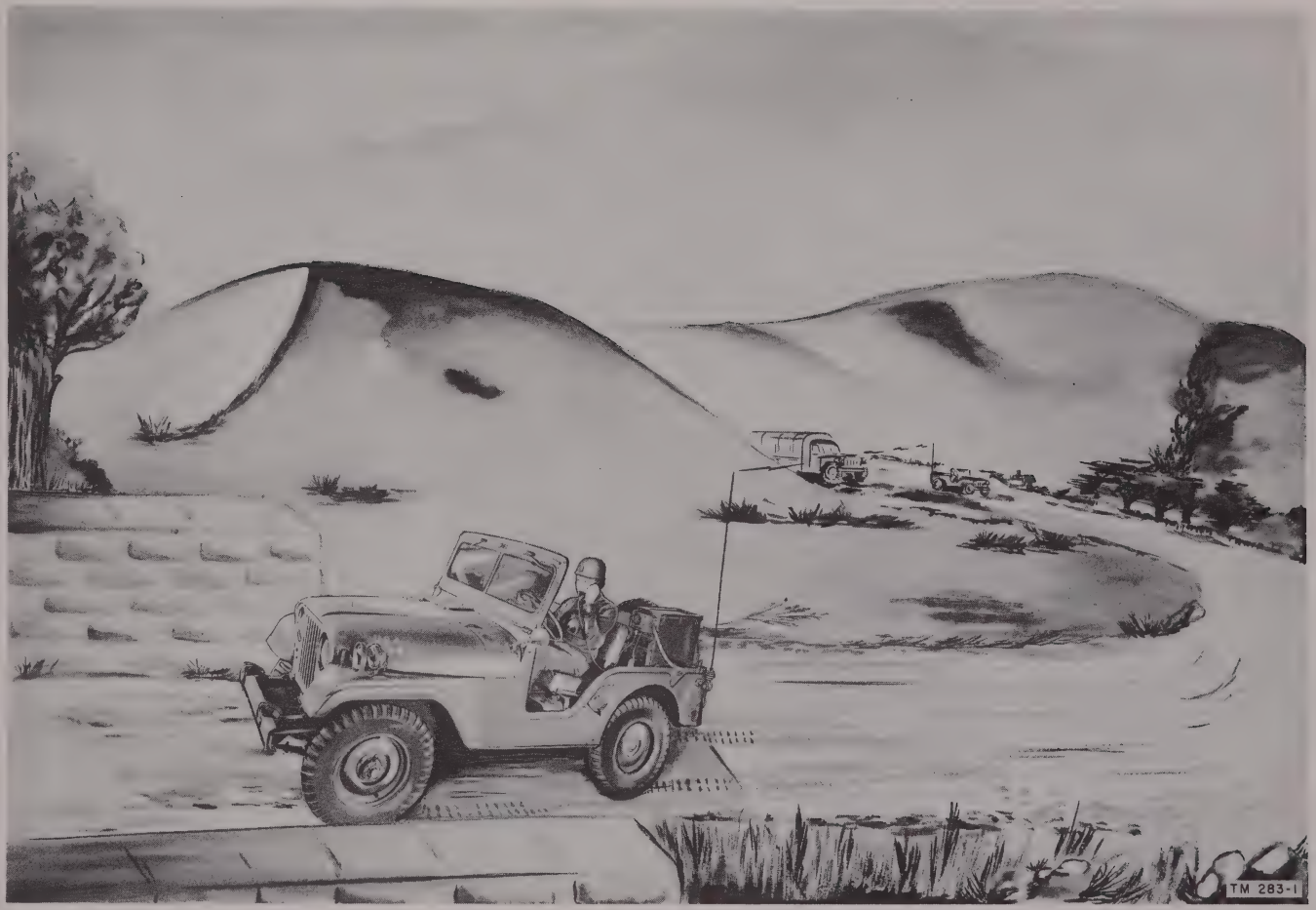


Figure 1. Radio Set AN/VRC–6(*).

Note. This instruction book will be replaced by TM 11–283 which, when published, will be listed in SR 310–20–4.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This instruction book contains instructions for the installation, operation, maintenance, and repair of Radio Set AN/VRC–6(*) (fig. 1). In addition to this information there are two appendixes covering a list of references and an identification table of parts of all components which are not included in separate instruction books.

b. Official nomenclature followed by (*) is used to indicate the three models of equipment covered in this instruction book. Thus, Radio Set AN/VRC–6(*) represents Radio Set AN/VRC–6 (24 volts), Radio Set AN/VRC–6X (12 volts), and Radio Set AN/VRC–6Y (6 volts).

2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of Army materiel and equipment.

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745–45–5 (Army) and AFR 71–4 (Air Force).

b. DA AGO Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR 700–45–5.

c. USAF Form 54, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700–45–5 and AFR 65–26.

d. DA AGO Form 11–238, Operator First Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form (fig. 26).

e. DA AGO Form 11–239, Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form (fig. 27).

f. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

Radio Set AN/VRC–6(*) (fig. 1) is a mobile f-m (frequency-modulated) set normally used for nontactical purposes. It operates in the frequency range of 25 to 50 mc (megacycles). The power output is approximately 25 watts and is sufficient to allow consistent network operation with station spacings of approximately 25 miles under most conditions.

a. The radio set can be installed in several different types of vehicles such as railroad trains, jeeps, sedans, trucks, and ambulances. The cabinet which houses the radio set may be mounted in various positions to facilitate installation.

b. Flexibility is provided by the use of plug-in power supplies; it is only necessary to use the correct power supplies for the receiver and transmitter, and make a few interconnections when changing the radio set from one source voltage to another. Each power supply makes its own individual interconnections, thus preventing the use of an improper source of power.

c. Control of the radio set is maintained at either the radio set proper or elsewhere in the

vehicle. This is achieved by the use of a remote control unit which has all the facilities necessary for push-to-talk operation. Operation is simplified to the extent that a qualified radio operator is not necessary. The driver, in most cases, should be able to operate the radio set.

d. The radio set consists of a cabinet, a radio receiver, a receiver power supply, a radio transmitter, a transmitter power supply, a control unit, a control cable, a battery cable, an antenna, a coaxial antenna cable, a mounting rack, and a control unit mounting. The electrical components of the radio set are shown in block diagram form in figure 2.

4. System Application

Radio Set AN/VRC–6(*) is a small, mobile receiving and transmitting station. It is one radio set in a group which is collectively called the *nontactical series.* This group is divided into two frequency ranges; that is, the *low band* covering 25 to 50 mc and the *high band* covering 152 to 174 mc. Radio Set AN/VRC–6(*) operates in the low band. It is possible that the radio set could be operated in conjunction with civilian facilities if necessary. A typical network of low band radio sets is illustrated in figure 3. This is a theoretical set-up used to show how communications could be carried on; however, many other combinations of equipment are possible.

a. Since Radio Set AN/VRC–6(*) is mobile, it has certain limitations; the siting may not always be favorable and it is usually operated from battery power. Battery operation limits the transmitter output to approximately 25 watts. The antenna always is installed near the ground in comparison to the antenna of a fixed station and, therefore, is more affected by obstructions such as trees, hills, and buildings.

b. Simplex conversation (both directions, one at a time) can be carried on with any of the radio sets in the low band group except Radio Receiving Set AN/FRR–44.

c. The equipments with which Radio Set AN/VRC–6(*) can maintain communication are as follows:

(1) Radio Set AN/TRC–22.
(2) Radio Set AN/TRC–33.
(3) Radio Set AN/FRC–15.
(4) Radio Set AN/VRC–6(*).
(5) Radio Receiving Set AN/FRR–44 (only one-way communication to Radio Receiving Set AN/FRR–44 is possible).

5. Technical Characteristics of Radio Transmitter T-208/U

Frequency range	25 to 50 mc.
Transmitter type	Crystal-controlled f-m.
Distance range	Approximately 25 miles.
Type of modulation	F-m, as derived from phase modulation.
Frequency deviation	15-kc (kilocycle) deviation for 100-percent modulation at 1,000 cycles. Deviation limited to 15 kc for all frequencies.
Type of transmission	Voice.
Crystals:	
Type	Crystal Unit CR–27/U.
Frequency range	1,562.5 to 3,125 kc.
Multiplication in transmitter	16 times on all frequencies.
Output impedance	50 ohms into coaxial cable.
Audio input:	
Carbon microphone	100 mv (millivolts) for 100-percent modulation at 1,000 cycles.
600-ohm line input	200 mv for 100-percent modulation at 1,000 cycles.

5. Technical Characteristics of Radio Transmitter T-208/U—(contd)

Spurious emission	Attenuated at least 70 db (decibels) below carrier.
Antenna	¼ wavelength vertical.
Number of tubes	13.
Power supply	External d-c (direct current) operated. Dynamotor-Power Supply DY–100/U, DY–93/G, or DY–98/G.
Adaptability to service conditions:	
Altitude	10,000 feet, maximum.
Shocks and vibrations	Will withstand shocks, strains, and vibrations in vehicle traveling over rugged terrain.
Weather and climate	Fungiproofed and moistureproofed.
Normal operating temperature	−40° C (−40° F) to +65° C (149° F).
Weight, unmounted	8½ pounds.
Dimensions	14½ in. long by 4¼ in. wide by 8⅛ in. high.

6. Technical Characteristics of Radio Receiver R-257/U

Frequency range	25 to 50 mc.
Receiver type	Dual conversion, crystal controlled, superheterodyne, fixed frequency.
Crystal frequency range	16.4 to 28.9 mc (third overtone crystal).
Type of crystal	Crystal Unit CR–32/U.
Types of signals which can be received	F-m (15-kc deviation).
Number of tubes	21.
Intermediate frequencies	7.8 mc and 455 kc.
Power input	Suitable d-c supply plugged into receiver (Power Supply PP–867/U, PP–868/U, or PP–869/U).
Audio-frequency response	300 to 3,500 cps (cycles per second).
Output impedance	8 ohms.
Power output	0.5 watts at less than 10-percent distortion.
Antenna type	¼ wavelength vertical.
Special features	Squelch and muting circuits.
Adaptability to service conditions:	
Altitude	10,000 feet, maximum.
Shocks and vibrations	Will withstand shocks, strains, and vibrations in a vehicle traveling over rugged terrain.
Weather and climate	Fungiproofed and moistureproofed.
Normal operating temperature	−40° C (−40° F) to +65° C (149° F).
Weight	16 pounds.
Dimensions	14½ in. long by 5¾ in. wide by 8½ in. high.

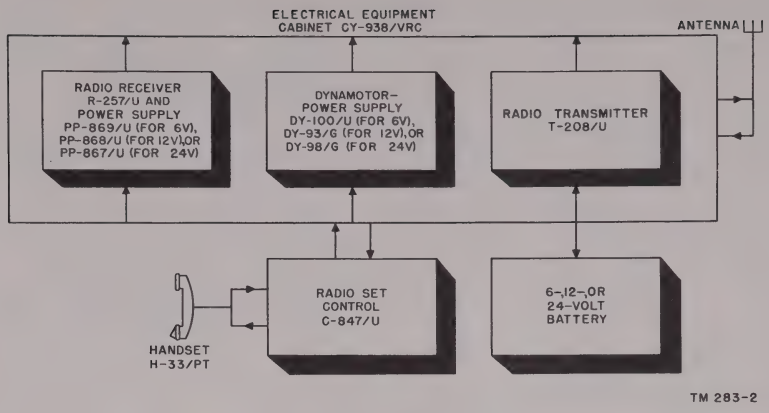


Figure 2. Radio Set AN/VRC-6(*), block diagram.

7. Technical Characteristics of Dynamotor-Power Supplies DY-100/U, DY-93/G, and DY-98/G (Transmitter Power Supplies)

Power input:

Dynamotor-Power Supply DY–100/U	6 volts d-c 40 amperes.
Dynamotor-Power Supply DY–93/G	12 volts d-c 20 amperes.
Dynamotor-Power Supply DY–98/G	24 volts d-c 10 amperes.

Power output:

380 volts d-c	180 ma (milliamperes).
225 volts d-c	45 ma.
−25 volts d-c	5 ma.
24 volts d-c	1.2 amperes (Dynamotor-Power Supply DY–98/G.)
6.3 volts a-c (alternating current)	2 amperes (Dynamotor-Power Supply DY–98/G).
6 volts d-c	0.3 ampere
6 volts d-c	0.9 ampere (Dynamotor-Power Supplies DY–100/U and DY–93/G).
6 volts d-c	2 amperes (Dynamotor-Power Supplies DY–100/U and DY–93/G).
1.3 volts d-c	2 amperes.
1.3 volts d-c	1 ampere.

Adaptability to service conditions:

Altitude	10,000 feet, maximum.
Shocks and vibrations	Will withstand shocks, strains, and vibrations in a vehicle traveling over rugged terrain.
Weather and climate	Fungiproofed and moistureproofed.
Normal operating temperature	−40° C (−40° F) to +65° C (149° F).

Weight ..... 24 pounds.

Dimensions ..... 14½ in. long by 7 in. wide by 8⅝ in. high.

8. Technical Characteristics of Power Supplies PP-867/U, PP-868/U, and PP-869/U (Receiver Power Supplies)

Rated input power:

Power Supply PP–869/U	6 volts d-c	3.7 amperes.
Power Supply PP–868/U	12 volts d-c	2.0 amperes.
Power Supply PP–867/U	24 volts d-c	1.1 amperes.

Filament and heater circuit power drains:

Power Supply PP–869/U	6.3 volts d-c	0.45 ampere.
	6.3 volts d-c	1 ampere.
	1.4 volts d-c	1.25 amperes.
Power Supply PP–868/U	6.3 volts a-c	0.45 ampere.
	6.3 volts a-c	1 ampere.
	1.4 volts a-c	1.25 amperes.
Power Supply PP–867/U	6.3 volts a-c	0.45 ampere.
	24 volts d-c	250 ma.
	1.4 volts d-c	1.25 amperes.

Plate, screen, and bias circuit power drains:

155 volts d-c	15 ma.
150 volts d-c	5 ma.
140 volts d-c	50 ma.
−40 volts d-c	0.5 ma.

Adaptability to service conditions:

Altitude	10,000 feet, maximum.
Shock and vibration	Will withstand shocks, strains, and vibrations in a vehicle traveling over rugged terrain.
Weather and climate	Fungiproofed and moistureproofed.
Normal operating temperature	From −40° C (−40° F) to 70° C (+158° F).
Dimensions	5 in. high by 6¼ in. wide by 7 in. long.
Weight	10 pounds.

9. Packaging Data

Radio Set AN/VRC–6(*) is packaged for both domestic and export shipment when required. A single wooden packing case divided into two compartments contains the cartons of components for export shipment. In domestic packaging, the wooden packing case is replaced by two cartons. The smaller individual cartons are packed the same for either type of shipment. A packing slip is attached to the outside of the case. The size, weight, and volume of the case or cartons are indicated in the chart on page 7.

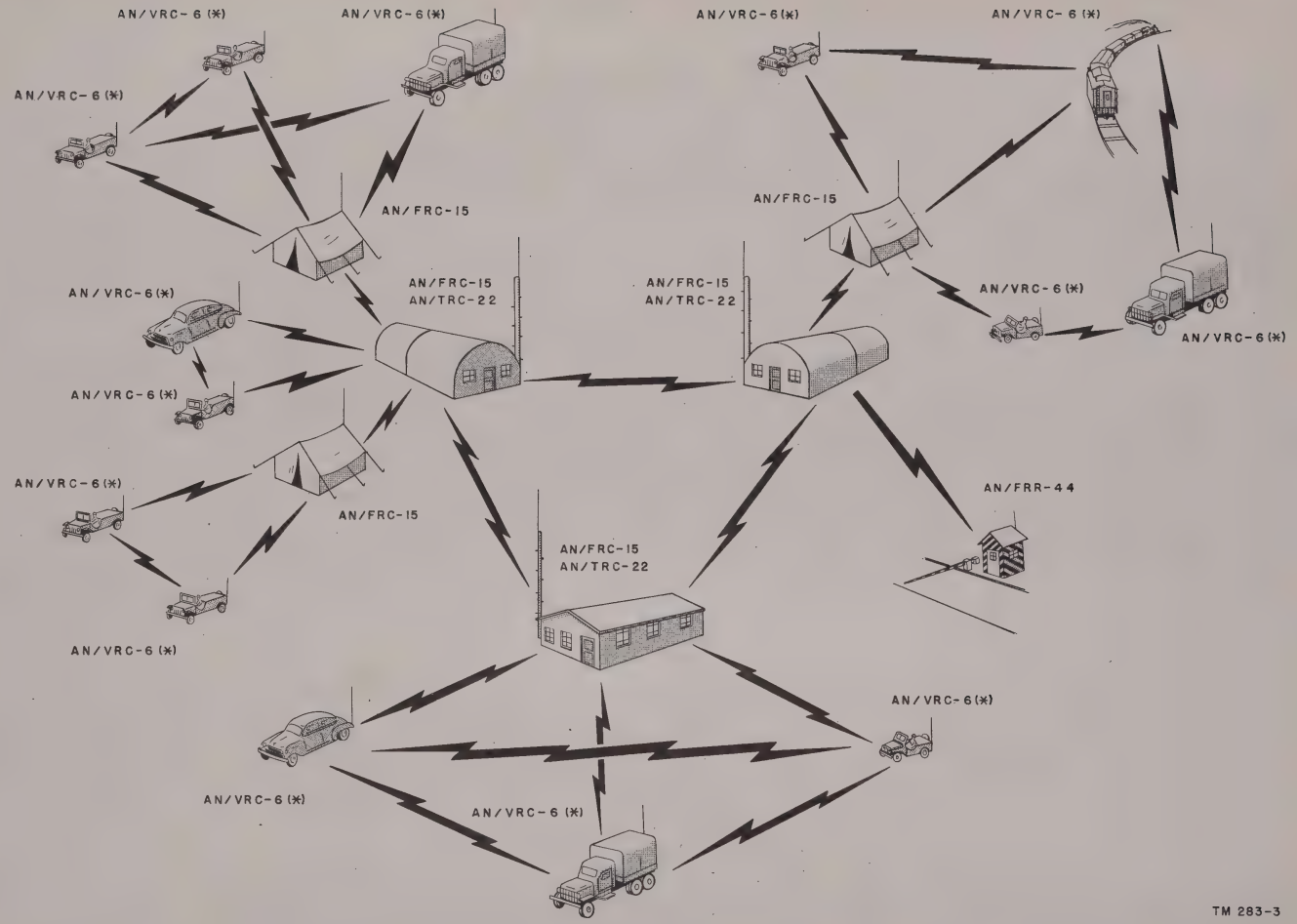


Figure 3. Radio Set AN/VRC-6(*), nontactical series system application.

9. Packaging Data (contd)

Type of packaging	Number of cases	Contents	Height (in.)	Width (in.)	Length (in.)	Volume (cu ft)	Unit weight (lbs.)
Domestic	2	Radio set	25⅞	16½	27⅝	6.8	156
		Accessories	12¼	16⅛	24½	4.9	38
Export	1	Radio set and accessories	25⅞	16⅞	42⅛	10.3	249

a. Export Packing. Radio Transmitter T–208/U, Radio Receiver R–257/U, and the transmitter and receiver power supplies are installed in Electrical Equipment Cabinet CY–938/VRC. The cabinet is fastened to Electrical Equipment Rack MT–1236/VRC as it would be for installation in a vehicle. Pads are used on all corners of the cabinet for shock protection. It then is inclosed in a corrugated carton. The carton is sealed into a moisture-vaporproof bag which then is placed in a water-resistant carton which occupies the larger compartment of the wooden packing case. The smaller compartment of the case holds five cartons which contain the smaller components of the radio set. An illustration showing the method of packing the cartons in the case is shown in figure 15.

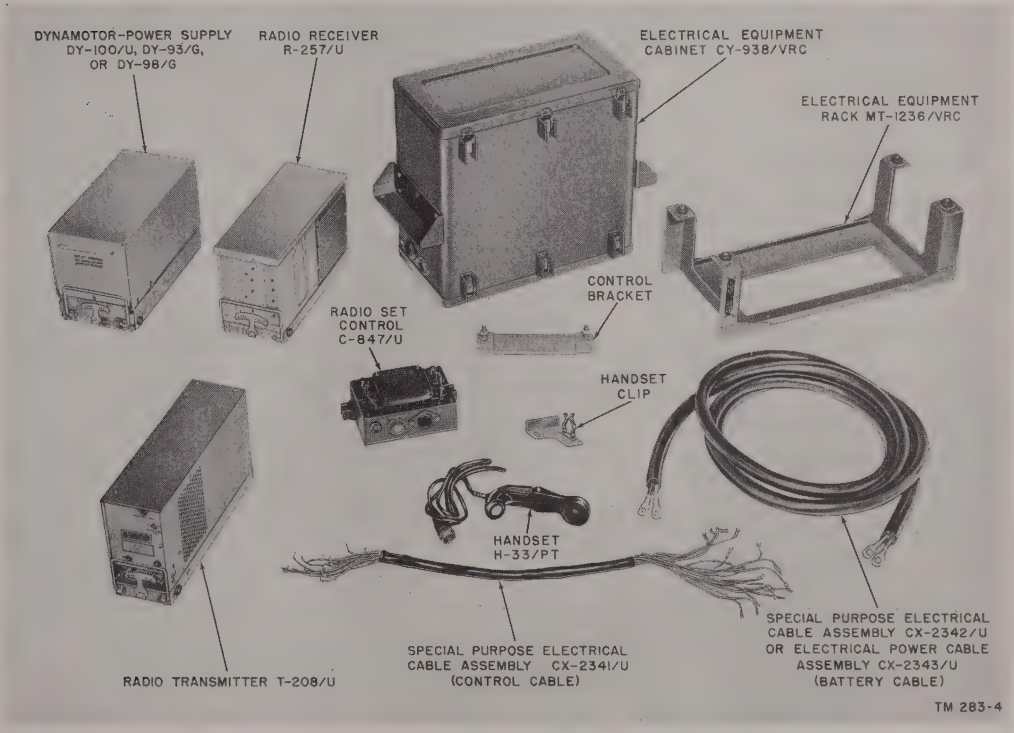

DYNAMOTOR-POWER SUPPLY DY-100/U, DY-93/G, OR DY-98/G
RADIO RECEIVER R-257/U
ELECTRICAL EQUIPMENT CABINET CY-938/VRC
ELECTRICAL EQUIPMENT RACK MT-1236/VRC
CONTROL BRACKET
RADIO SET CONTROL C-847/U
HANDSET CLIP
HANDSET H-33/PT
RADIO TRANSMITTER T-208/U
SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-2341/U (CONTROL CABLE)
SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-2342/U OR ELECTRICAL POWER CABLE ASSEMBLY CX-2343/U (BATTERY CABLE)
TM 283-4

Figure 4. Radio Set AN/VRC–6(*), operating components.

b. Contents of Cartons. The accompanying chart lists the contents of each carton in the case.

Package No.	Item
1	Electrical Equipment Cabinet CY–938/VRC (with mtg brackets). Radio Transmitter T–208/U. Radio Receiver R–257/U. Dynamotor-Power Supply DY–100/U, DY–93/G, or DY–98/G. Power Supply PP–867/U, PP–868/U, or PP–869/U. Electrical Equipment Rack MT–1236/VRC.
2	Radio Set Control C–847/U.
3	Running spares.
4	Special Purpose Electrical Cable Assembly CX–2342/U (6- and 12-volt battery cable) or Electrical Power Cable Assembly CX–2343/U (24-volt battery cable).
5	Special Purpose Electrical Cable Assembly CX–2341/U (control cable).
6	Instruction books.
7	Handset H–33/PT.

10. Table of Components

The components (fig. 4) which make up the three models of Radio Set AN/VRC–6(*) are listed below.

Note. This list is for general information only. See appropriate supply publications for information pertaining to requisition of spare parts.

Component	Radio Set AN/VRC–6Y	Radio Set AN/VRC–6X	Radio Set AN/VRC–6	Dimensions of components				
				Height (in.)	Depth (in.)	Length (in.)	Volume (cu ft)	Weight (lb)
Radio Receiver R–257/U	1	1	1	8½	5¾	14½	.43	16
Power Supply PP–869/U	1	0	0	5	6¼	7	.12	10
Power Supply PP–868/U	0	1	0	5	6¼	7	.12	10
Power Supply PP–867/U	0	0	1	5	6¼	7	.12	10
Radio Transmitter T–208/U	1	1	1	8⁹⁄₁₆	4½	14½	.33	8½
Dynamotor-Power Supply DY–100/U	1	0	0	8⅝	7	14½	.36	24
Dynamotor-Power Supply DY–93/G	0	1	0	8⅝	7	14½	.36	24
Dynamotor-Power Supply DY–98/G	0	0	1	8⅝	7	14½	.36	24
Electrical Equipment Cabinet CY–938/VRC (with hardware)	1	1	1	17⁷⁄₁₆	10¾	18¹⁵⁄₁₆	1.05	33
Radio Set Control C–847/U	1	1	1	5	2¼	7½	.07	4½
Electrical Equipment Rack MT–1236/VRC	1	1	1	7⅝	10¾	23⅜		10½
Special Purpose Electrical Cable Assembly CX–2342/U	1	1	0			192		
Electrical Power Cable Assembly CX–2343/U	0	0	1			147		
Special Purpose Electrical Cable Assembly CX–2341/U	1	1	1			35⅛		

Component	Radio Set AN/VRC–6Y	Radio Set AN/VRC–6X	Radio Set AN/VRC–6	Dimensions of components				
				Height (in.)	Depth (in.)	Length (in.)	Volume (cu ft)	Weight (lb)
Handset H–33/PT	1	1	1					
Control bracket	1	1	1	2 11/16	1/8	9 3/4		
Kit, running spares	1	1	1	6	8	8	.22	
Kit, running spares	0	1	0	6	8	8	.22	
Kit, running spares	0	0	1	6	8	8	.22	
Instruction Book (Radio Set AN/VRC–6(*))	2	2	2	8 1/2	1/2	11	.03	1
Instruction Book (Radio Receiver R–257/U)	2	2	2	8 1/2	1/2	11	.03	1
Instruction Book (Radio Transmitter T–208/U)	2	2	2	8 1/2	1/2	11	.03	1
Instruction Book (Power Supplies PP–867/U, PP–868/U, and PP–869/U)	2	2	2	8 1/2	1/2	11	.03	1
Instruction Book (Dynamotor-Power Supplies DY–100/U, DY–98/G, and DY–93/G)	2	2	2	8 1/2	1/2	11	.03	1

11. Description of Electrical Equipment Cabinet CY-938/VRC

(figs. 5 and 29)

Electrical Equipment Cabinet CY–938/VRC is used to house the receiver, transmitter, and transmitter power supply of Radio Set AN/VRC–6(*). It is made of aluminum with spot-welded construction and is coated with a semigloss olive-drab enamel. The cabinet consists of a body and two covers. The covers, which are identical, are held on by six trunk-type latches and provide waterproof protection for the components and parts within the cabinet. Two entrance holes are provided on the side for the battery cable and the control cable. The interior has rails which are spring-loaded. When the components are installed, these rails hold them firmly in place. Multipin connectors are provided in the rear to automatically interconnect the three plug-in components when they are inserted into the cabinet. Terminal boards are mounted at the rear to allow connection of the jacks to external circuits. Fuse F801, which is replaceable from the front when the receiver is removed, protects the primary power source from damage due to overload. Nine threaded holes, which form a pattern to permit two types of mounting, are provided on each side. Two brackets which fasten to the sides permit installation on Electrical Equipment Rack MT–1236/VRC.

12. Description of Radio Transmitter T-208/U

(fig. 6)

Radio Transmitter T–208/U is a crystal-controlled f-m transmitter capable of operation in the frequency range of 25 to 50 mc. It uses 13 tubes and has a power output of approximately 25 watts. Two separate oscillators are used to permit a choice of either of two preset frequencies. The frequency modulation is accomplished by the phase-shift method, which permits direct crystal control of the carrier frequency.

a. The transmitter depends on a separate power supply for power and on a control unit for operating controls. It is a plug-in type component, and all external connections are made through a 32-contact male connector located on the rear of the transmitter. Controls and test points for alining the transmitter are located on the front panel. A folding handle provides a means of removing the transmitter from the cabinet when replacement, tuning, or repair is necessary.

b. The transmitter requires the use of a power supply which is a separate component of the system. Refer to paragraph 7 for the technical characteristics of the transmitter power supplies.

c. A vertical antenna which is cut for 1/4 wavelength at the operating frequency is coupled to the transmitter through a length of Radio Frequency Cable RG–58C/U. An antenna change-

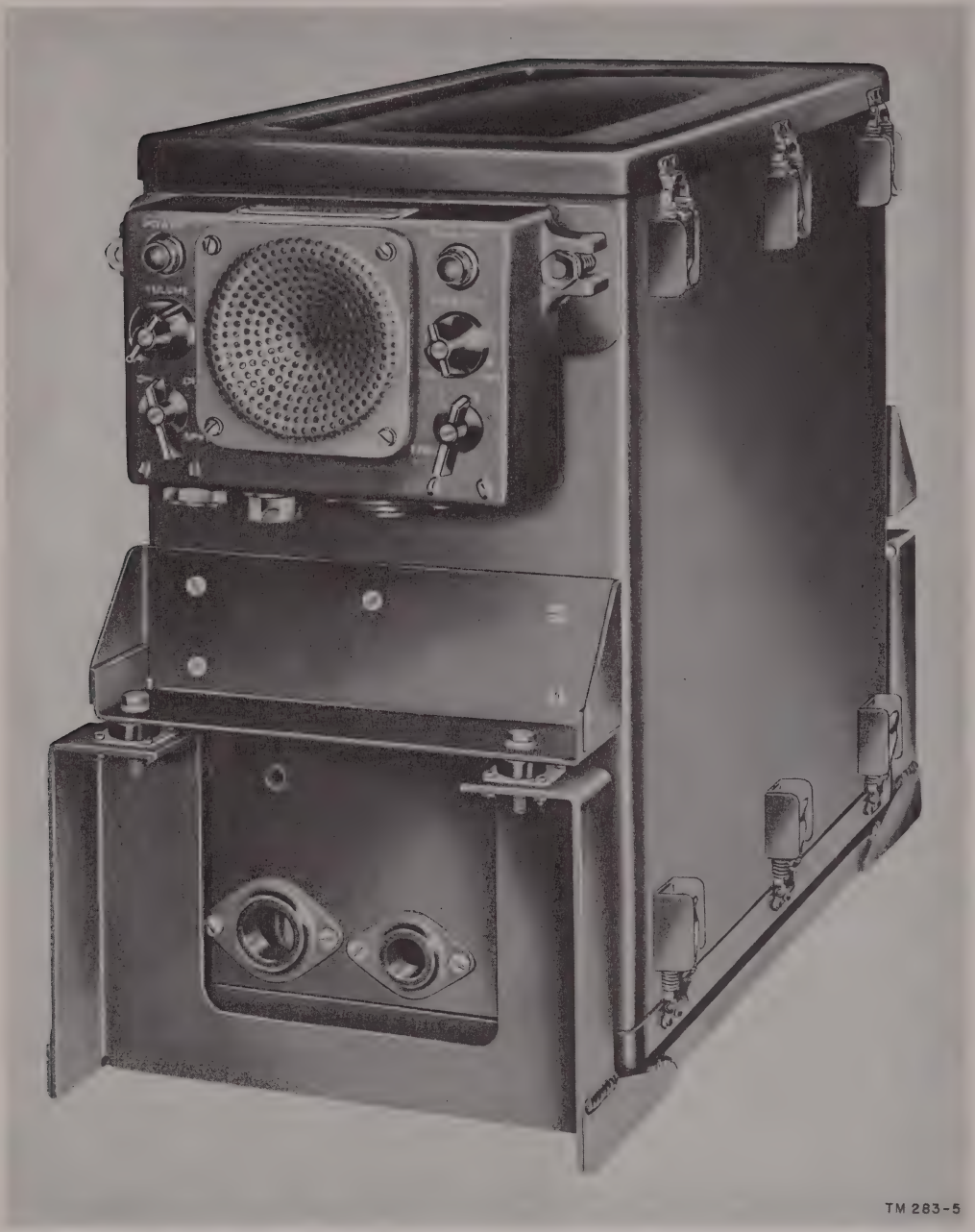


Figure 5. Electrical Equipment Cabinet CY–938/VRC, installed in rack, oblique view.

over relay is incorporated in the circuit so that the same antenna can be used for reception when the transmitter is disabled. This relay also prevents the receiver from being damaged by r-f (radio-frequency) overload during transmission.

13. Description of Radio Receiver R-257/U (fig. 7)

a. Radio Receiver R–257/U is a 21-tube f-m dual conversion superheterodyne receiver. It operates at a crystal-controlled frequency within the frequency range of 25 to 50 mc. The high-frequency oscillators are crystal-controlled to provide maximum stability. The receiver connections to the radio set are made through a 30-contact male connector located on the rear panel. Connections are made automatically when the receiver is installed in Electrical Equipment Cabinet CY–938/VRC. All controls which affect the receiver during normal operation are located on Radio Set Control C–847/U.

b. The receiver consists of a base assembly with plug-in subassemblies for the various groups of stages. The base has interconnecting wiring and jacks to complete the signal and current paths through the receiver. This construction permits rapid servicing and a minimum of stock parts for replacement. Each subassembly occupies a shielded compartment and is further shielded by a metal sleeve between the subassembly and compartment walls.

c. The receiver can be made to operate at a frequency different from that initially set up. To

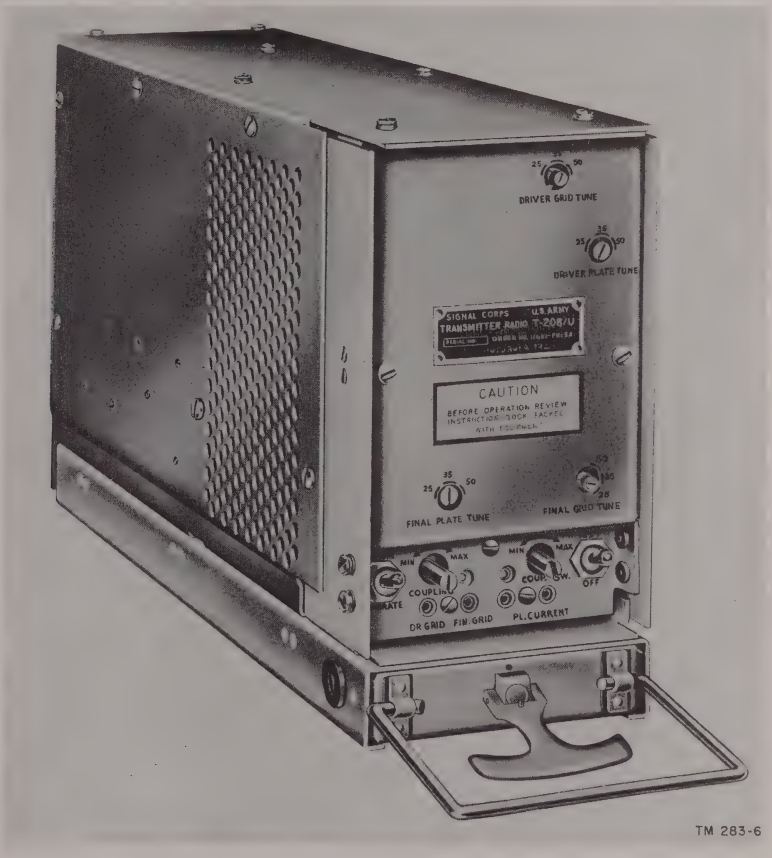


Figure 6. Radio Transmitter T–208/U, oblique view.

accomplish this, it is necessary to change a crystal in the local oscillator subassembly and realine all the stages preceding the first mixer. This operation should not be attempted by the operator; it must be performed by a competent radio repairman who is familiar with repair techniques of this equipment.

d. One of the receiver compartments is designed to accommodate the receiver power supply which is a separate component. The power supply, which is plugged into the receiver, must be capable of operating at the correct input voltage for the radio set in which it is installed. The receiver is designed to use Power Supply PP–869/U, Power Supply PP–868/U, or Power Supply PP–867/U for 6-, 12-, or 24-volt operation, respectively. Refer to paragraph 8 for the technical characteristics of the receiver power supplies.

14. Description of Radio Set Control C-847/U (fig. 8)

Radio Set Control C–847/U is used to control the operation of Radio Set AN/VRC–6(*). It consists of a small waterproof metal box which contains the front panel controls and a speaker for monitoring purposes. It is mounted either on the radio set or at some other location in the vehicle, usually the instrument panel. Mounting is accomplished by means of two flanges on each side of the cabinet. These flanges are slotted so that they will mate with the stud bolts on the mounting bracket (if used). The bracket is attached to the vehicle or Electrical Equipment Cabinet CY–938/VRC, and allows the control to be removed easily for repair. The control unit contains four controls, two pilot lamps, a speaker, audio attenuator pads, and connectors. When

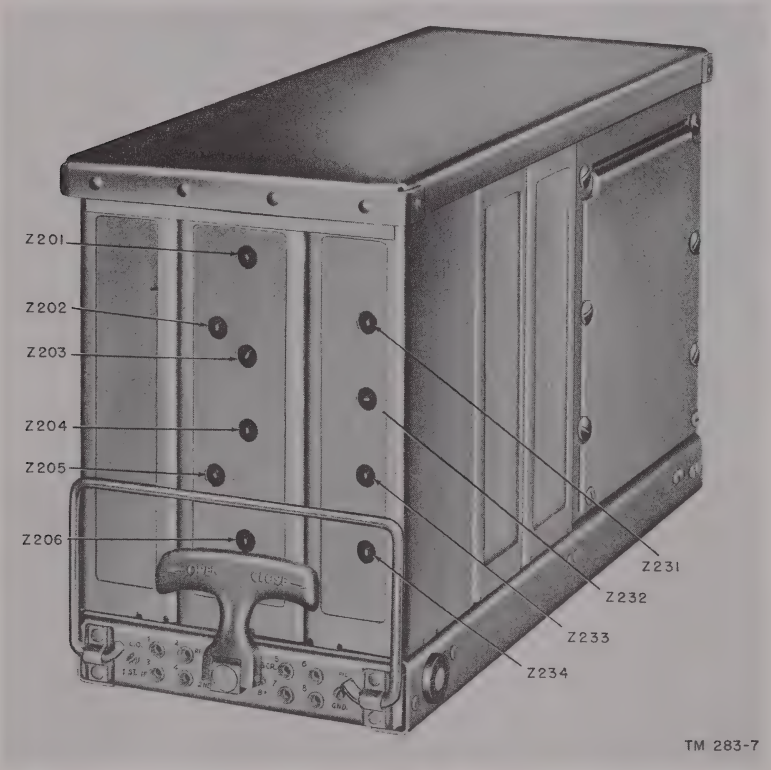


Figure 7. Radio Receiver R–257/U, oblique view.

used with Radio Set AN/VRC–6(*), it provides the following functions:

a. Turns power on and off for the radio set.

b. Indicates when the power is on.

c. Indicates when the transmitter is on.

d. Selects either of two preset transmitter frequencies.

e. Controls the receiver squelch threshold level, and provides a means of disabling the squelch circuit.

f. Controls the volume of the monitor speaker and handset.

g. Provides interconnection from the handset to the receiver, or to the transmitter for push-to-talk operation.

15. Description of Dynamotor-Power Supplies DY-100/U, DY-93/G, and DY-98/G

(fig. 9)

a. There are three models of the transmitter power supply available for operation with Radio Set AN/VRC–6(*). The power supply unit is located in Electrical Equipment Cabinet CY–938/VRC between the receiver and transmitter, and uses the same type of interconnection as those two components. The purpose of the power supplies is to change the 6-, 12-, or 24-volt battery power output to the voltages required to operate Radio Transmitter T–208/U. Besides these circuits, there are additional circuits which aid in the control of the radio set.

b. Dynamotor-Power Supplies DY–100/U (6 volts), DY–93/G (12 volts), and DY–98/G (24 volts) are used in conjunction with Radio Sets AN/VRC–6Y, –6X, and –6 respectively. Figure 9 represents all three models of the power supply. With the top covers off, the 6- and 12-volt models are almost identical; however, the 24-volt model differs in appearance because of added parts which are necessary for extra filtering.

Note. Transmission time should be limited to prevent overheating of the dynamotors.

16. Receiver Power Supplies PP-869/U, PP-868/U, and PP-867/U

(fig. 10)

a. The receiver power supply is constructed on a separate chassis which is designed to occupy a compartment in the receiver. Three different models are available to provide operation with vehicular voltage sources of 6, 12, or 24 volts. Interconnection between the power and control circuits is made through a 15-contact female connector which connects to a mating connector on the receiver base. There are no controls on the power supplies.

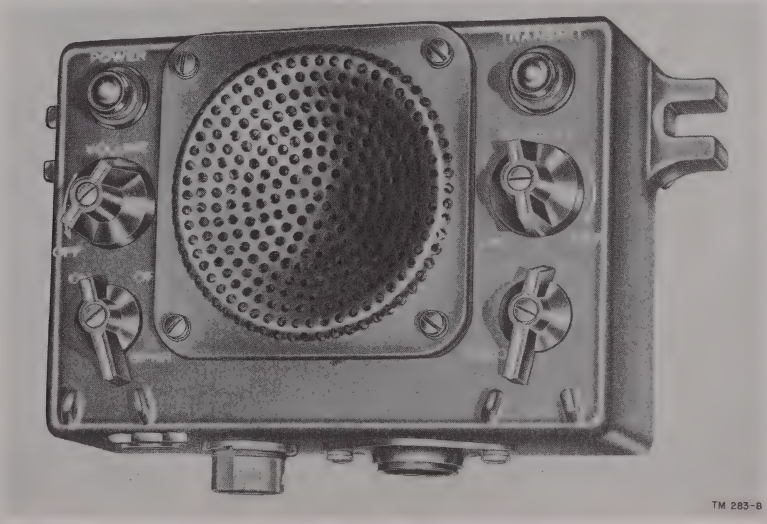


Figure 8. Radio Set Control C–847/U, oblique view.

b. Power Supply PP–869/U is used with Radio Set AN/VRC–6Y to adapt Radio Receiver R–257/U to a 6-volt d-c power source. Power Supply PP–868/U permits Radio Receiver R–257/U to be used with Radio Set AN/VRC–6X which operates from a 12-volt d-c power source. The 24-volt version of the power supply, Power Supply PP–867/U, is used with Radio Set AN/VRC–6. Figure 10 represents all three of the power supply models.

17. Antennas

Either Mast Base AB–15/GR or Antenna AT–129/VR is used with Radio Set AN/VRC–6(*). Mast Base AB–15/GR is more rugged than Antenna AT–129/VR, and is used when the equipment is installed in tactical vehicles such as jeeps and command cars. Antenna AT–129/VR is used for nontactical vehicles such as sedans and ambulances. The appropriate antenna is contained in an installation kit supplied with the equipment.

a. Mast Base AB–15/GR. This antenna consists of a mast base (fig. 11), mast sections, and a length of Radio Frequency Cable RG–58C/U. The appropriate mast sections for the operating frequency must be screwed into the mast base. The following chart lists the mast section combinations used for various frequency ranges:

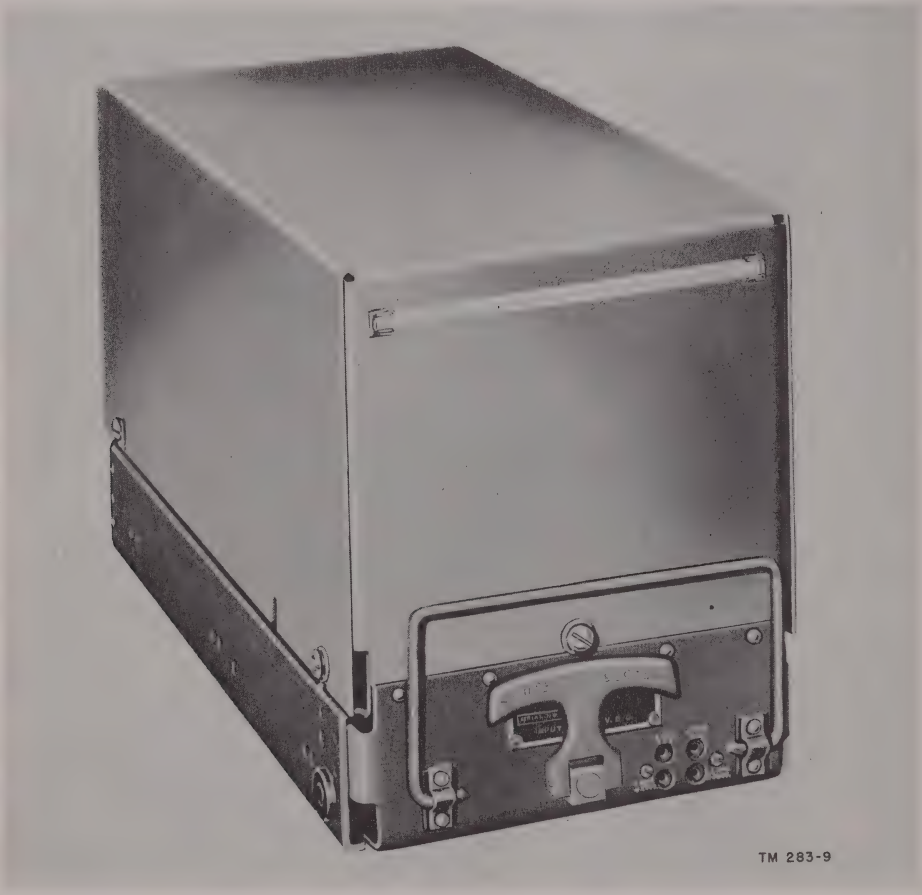


Figure 9. Dynamotor-Power Supply DY–100/U, DY–98/G, or DY–98/G, oblique view.

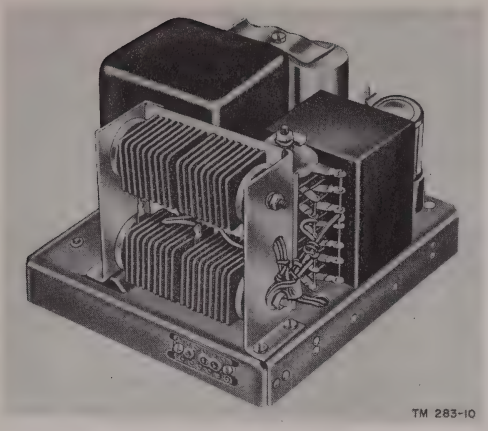


Figure 10. Power Supply PP–867/U, PP–868/U, or PP–869/U (receiver).

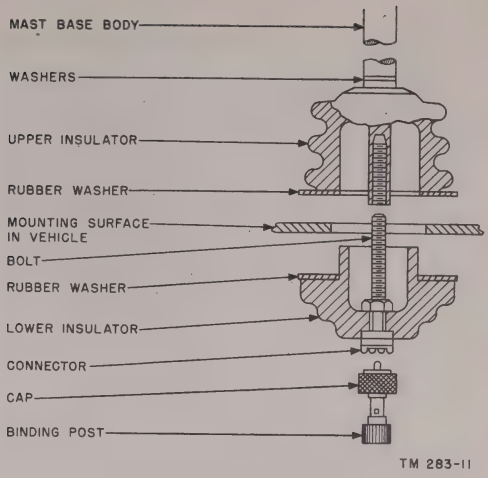


Figure 11. Mast Base AB–15/GR, installation drawing.

25-30 mc	30-36 mc	36-44 mc	44-50 mc
2 AB–21/GR	1 AB–21/GR	1 AB–22/GR	1 AB–22/GR
1 AB–22/GR	1 AB–22/GR	1 MS–118–A	1 AB–24/GR
1 MS–118–A	1 MS–118–A		

b. Antenna AT–129/VR. This antenna is adjustable and is used in installations where a less cumbersome antenna is desirable. It is adjusted to approximately ¼ wavelength at the operating frequency. The maximum length is 88 inches, and the minimum length is 78 inches.

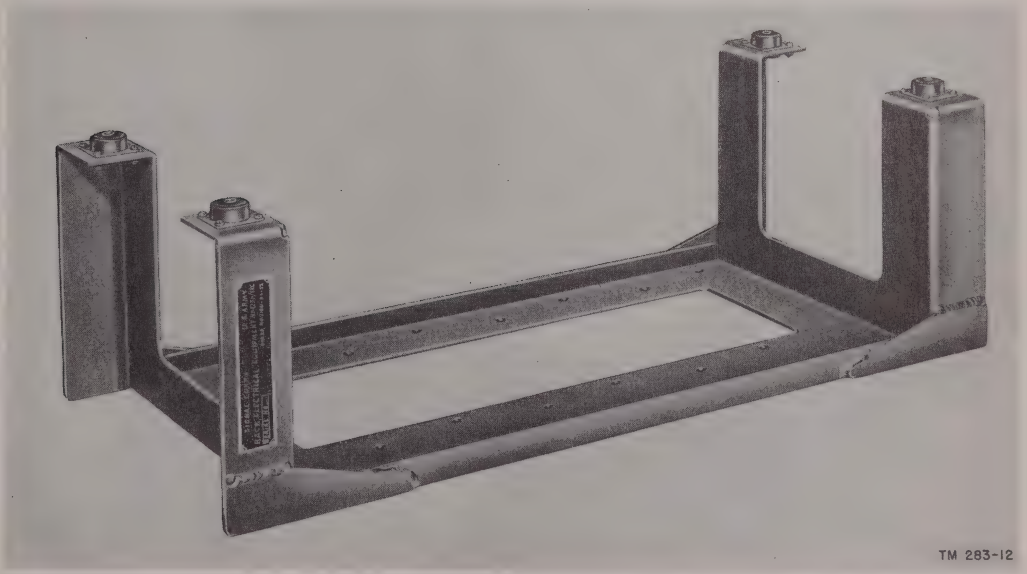


Figure 12. Electrical Equipment Rack MT–1236/VRC.

18. Electrical Equipment Rack MT-1236/VRC (fig. 12)

Electrical Equipment Rack MT–1236/VRC is a metal support which cradles Electrical Equipment Cabinet CY–938/VRC. The cabinet rests on four rubber shock mounts, each of which is on a post which extends approximately 7 inches from the base. This keeps the cabinet from touching anything but the mounts and also permits two methods of mounting. The base of the rack has 24 holes which will allow it to be secured to a vehicle in various ways.

19. Control Bracket (fig. 13)

The control bracket is used in some installations to mount Radio Set Control C–847/U. It has three mounting holes which mate with the threaded holes on the side of Electrical Equipment Cabinet CY–938/VRC. Two studs are provided to hold the control with the aid of nuts and washers. Although the bracket is designed to secure the control to the cabinet it also can be used at other locations in the vehicles. Since the bracket is not used in all installations, it is supplied with the installation kit instead of with the radio set.

20. Handset H-33/PT and Handset Holder (fig. 14)

Handset H–33/PT (fig. 14) is a combination microphone and receiver with a push-to-talk switch and connecting cord. The carbon button microphone and the receiver have an impedance of approximately 40 and 150 ohms, respectively. A double-pole single-throw switch is provided for push-to-talk operation. The connecting cord is 6½ feet long and is terminated in a 10-pin audio connector which mates with the HANDSET connector on Radio Set Control C–847/U. A handset holder is included with the equipment to provide a means of securing the handset when it is not in use. The holder is packed with the spare parts and consists of a mounting bracket and clip assembly. The holder can be mounted on the radio set control or other convenient location. Refer to paragraph 27*f* for assembly and installation details.

21. Cables

a. Special Purpose Electrical Cable Assembly CX–2342/U and Electrical Power Cable Assembly CX–2343/U (Battery Cables). The battery cable (fig. 4) used with Radio Set AN/VRC–6(*) varies in characteristics, depending on the type of vehicle

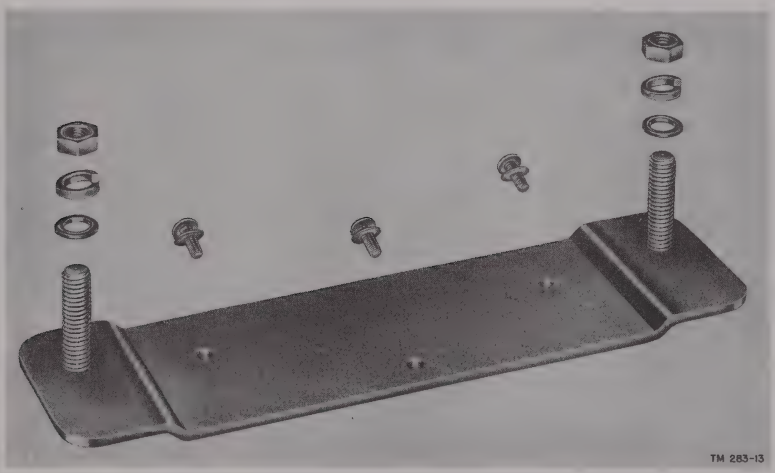


Figure 13. Control bracket.

in which it is installed and the voltage of the electrical system. In a jeep installation, for instance, the cable is shorter than in a sedan or truck installation. The same current capacity wire can be used in both the 6- and 12-volt systems, but it can be lighter in the 24-volt system because of the reduced current demand. All the battery cables are made up of two heavy current insulated wires incased in a heavy-duty rubber coating. The ends of the wires which connect to Electrical Equipment Cabinet CY–938/VRC have eye-type lugs soldered to them. The 6- and 12-volt systems use Special Purpose Electrical Cable Assembly CX–2342/U and the 24-volt system uses Electrical Power Cable Assembly CX–2343/U.

b. Special Purpose Electrical Cable Assembly CX–2341/U (Control Cable). The control cable (fig. 4) consists of 20 wires cabled together and cut to reach conveniently between Radio Set Control C–847/U and Electrical Equipment Cabinet CY–938/VRC. In installations where the control is located on the cabinet, such as for jeeps, the cable is approximately 18 inches long. In other types of installations, the length may be 16 feet or longer. The lead which carries the microphone audio signal is shielded. This shield is grounded at the cabinet end *only*.

22. Running Spares

A group of running spares is supplied with each radio set. Spares are provided for all normally expendable items such as tubes, fuses, pilot lamps, and vibrators. Each of the three radio sets has a different set of running spares. In all models the running spares are packed in the same packing case as the equipment. The following list shows the running spares provided for the three models of the equipment.

Item	Equipment		
	Radio Set AN/VRC–6Y	Radio Set AN/VRC–6X	Radio Set AN/VRC–6
Tube, electron type 1AD4	3	3	3
Tube, electron type 5840	1	1	1
Tube, electron type 5783	1	1	1
Tube, electron type 5678	4	4	4
Tube, electron type 6AK6	1	1	1
Tube, electron type 5672	2	2	2
Tube, electron type 2E24	2	2	2

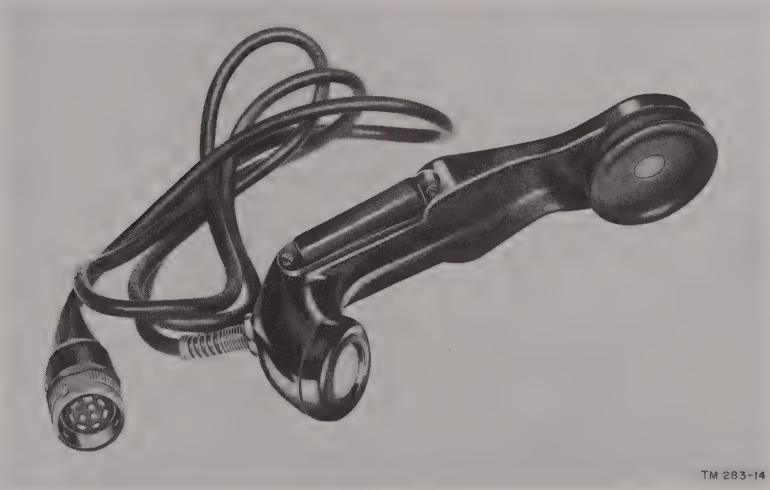


Figure 14. Handset H–33/PT.

22. Running Spares (contd)

Item	Equipment		
	Radio Set AN/VRC–6Y	Radio Set AN/VRC–6X	Radio Set AN/VRC–6
Tube, electron type 3B4	1	1	1
Tube, regulator (receiver power supply)	2	2	2
Tube, regulator (transmitter power supply)	4	4	4
Lamp, incandescent, 6 to 8 v, .15 amp	1	1	1
Vibrator, 24 v	0	0	2
Vibrator, 6 v	1	0	0
Vibrator, 12 v	0	1	0
Fuse, link type, 50 amp	2	2	2
Fuse, ceramic body cartridge type, 8 amp	2	0	0
Fuse, cartridge, 15 amp	2	0	0
Fuse, cartridge, 3 amp	0	0	5
Fuse, cartridge, 5 amp	0	5	0
Fuse, cartridge, 6 amp	0	0	2
Fuse, cartridge, 10 amp	0	2	0
Fuse, cartridge, 20 amp	0	0	2
Brush, dynamotor output	2	2	2
Brush, dynamotor input, 6 v	2	0	0
Brush, dynamotor input, 12 v	0	2	0
Brush, dynamotor input, 24 v	0	0	2

23. Difference in Models

The radio set is available in three different models, each designed to operate from a different voltage source. Basically, the models are the same, with exceptions listed below:

Item	Equipment		
	Radio Set AN/VRC–6Y	Radio Set AN/VRC–6X	Radio Set AN/VRC–6
Power Supply PP–869/U	X	—	—
Power Supply PP–868/U	—	X	—
Power Supply PP–867/U	—	—	X
Dynamotor-Power Supply DY–98/G	—	—	X
Dynamotor-Power Supply DY–100/U	X	—	—
Dynamotor-Power Supply DY–93/G	—	X	—
Special Purpose Electrical Cable Assembly CX–2342/U (power cable)	X	X	—
Electrical Power Cable Assembly CX–2343/U (power cable)	—	—	X
Running spares (6 v)	X	—	—
Running spares (12 v)	—	X	—
Running spares (24 v)	—	—	X

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

24. Siting

a. Location in Vehicle. The location of Radio Set AN/VRC–6(*) in its operating position is determined by the vehicle in which it is installed. Refer to the special instructions issued for recommended installation in specific vehicles. Although it is beyond the scope of this instruction book to cover the mounting details for all vehicles, sufficient information is provided so that the important factors concerning installation are known. This should be an aid to the installer in all types of installations.

b. Effects of Surroundings. Better operation of the equipment can be expected when the surrounding terrain is flat or when the vehicle is on the crest of a hill. Intervening hills, cliffs, densely wooded areas, buildings, and other obstructions can cause a serious reduction of the communication range. Depressions, valleys, and other low places are poor locations for radio reception and transmission because the surrounding high terrain absorbs r-f energy. Weak or otherwise undesirable signals may be expected if the set is operated under or close to steel bridges, underpasses, power lines, hospitals (diathermy machines, etc.) or power units. Whenever possible, try to move the vehicle away from the undesirable locations when operating the radio set.

25. Uncrating, Unpacking, and Checking New Equipment

Caution: Use extreme caution during the unpacking process so that no damage occurs to the radio set or its accessories. Dropping the packing case or poking through the smaller cartons with a sharp instrument can cause severe damage to the packed equipment. Take the package apart in such a manner that no undue force is placed upon the contents. If possible, unpack the equipment in a location which is dry and free of dust or dirt. Follow the unpacking instructions (fig. 15) in the order given to provide the most rapid means of safely removing the equipment from the case.

a. Unpacking.

(1) Cut the metal bands which encircle the wooden packing case. Use a pair of tin snips or a large pair of diagonal cutting pliers rather than forcing the bands off by some other method.

(2) Pry open the top cover; be careful not to force the prying instrument too far into the package. Remove the top cover and save it for possible repacking (save all the packaging material except the silica gel).

(3) Take out the small packages containing the instruction books, running spares, cables, etc.

(4) Place the case on its side and slide out the large package containing Electrical Equipment Cabinet CY–938/VRC and components.

(5) Open the flaps on the cartons and remove the contents.

(6) Slit the moisture-vaporproof bag (in the large carton) along its seam and remove the cabinet.

(7) The individual spare parts and accessories are wrapped and marked separately. Remove the wrappings of all the parts to be used.

(8) The unpacking procedure is now complete.

b. Checking. Always check equipment for damage which may have occurred during shipment. Remove each of the components and examine them for damage. This damage may consist of broken tubes, resistors, cut wires, shorted terminals, bent capacitor plates, smashed transformer cans, etc. To remove the components, rotate the lock-in rod handle 360° in a counterclockwise direction. Each component then may be slid out without disconnecting any wires since all connections are made by means of the plug at the rear of the component. Check all parts against the packing list which is in an envelope tacked to the outside of the case. The two side panels of the transmitter must be removed to check the tubes and other parts. The receiver top cover is secured by a single latch at the rear of the receiver. Removing this cover allows any of the plug-in units to be pulled out with the exception of the receiver power supply. To remove the power supply, it is necessary to take out six screws. The power supply then can be removed from the chassis and at the same time the plug to the receiver base can be disconnected. The transmitter power supply cover is secured by six screws. It is not necessary to remove the screws completely because the cover has open slots which permit it to be lifted from the power supply. When all the components have been checked and it is reasonably sure that there is no damage, replace the receiver power supply and component covers by reversing the procedure used for disassembly.

26. Connections
(fig. 16)

a. General. The method of mounting Electrical Equipment Cabinet CY–938/VRC will determine to some extent the sequence of connections for Radio Set AN/VRC–6(*). The input cables from the power source are connected from the front with the receiver removed. All other connections are made with the rear cover removed. This condition permits connections to be made after installation *only* if there is access to both the front and the rear of the cabinet. Refer to figure 16 for the connections to be made in Radio Set AN/VRC–6(*).

b. Power Connections.

Caution: Do not connect cables to the primary power source (battery or generator) until all other connections have been made. The battery cable has lugs on one end for connection to the radio set. They are to be connected in the following manner:

(1) Remove the front cover of Electrical Equipment Cabinet CY–938/VRC.

(2) Remove Radio Receiver R–257/U.

(3) Feed the end of the battery cable through the top cable hole at the rear left side of the cabinet.

(4) Connect the leads to terminals 1 and 2 of terminal board TB806, the ungrounded lead to terminal 1, and the grounded side of the battery to terminal 2.

(5) Make sure that a good 50-ampere fuse is securely in place in the fuseholder.

c. Jumper Connections. Because the radio set is designed to accommodate either one of three power sources it is necessary to make jumper connections between terminals at the rear of Electrical Equipment Cabinet CY–938/VRC. Remove the rear cover from the cabinet and make the proper connections as indicated below.

(1) In Radio Sets AN/VRC–6, –6X, and –6Y, place a jumper between terminals 3 and 4 of TB801, between terminals 5 and 6 of TB802, and between terminals 8 and 9 of TB802.

(2) In Radio Set AN/VRC–6Y (6-volt model), place a jumper between terminals 1 and 2 of TB803.

(3) In Radio Set AN/VRC–6X (12-volt model), place a jumper between terminals 3 and 4 of TB802.

(4) In Radio Set AN/VRC–6 (24-volt model), place a jumper between terminals 2 and 3 of TB803.

Note. It is possible to make the transmitter tube filaments operate continuously by connecting a jumper across two terminals in the transmitter power supply (figs. 50, 51, and 52). Refer to the transmitter power supply instruction book for connection details.

d. Control Connections. Remove the rear covers from Electrical Equipment Cabinet CY–938/VRC and from Radio Set Control C–847/U. Feed the spade lug end of Special Purpose Electrical Cable Assembly CX–2341/U (Control Cable) through the lower cable hole on the left side of the cabinet.

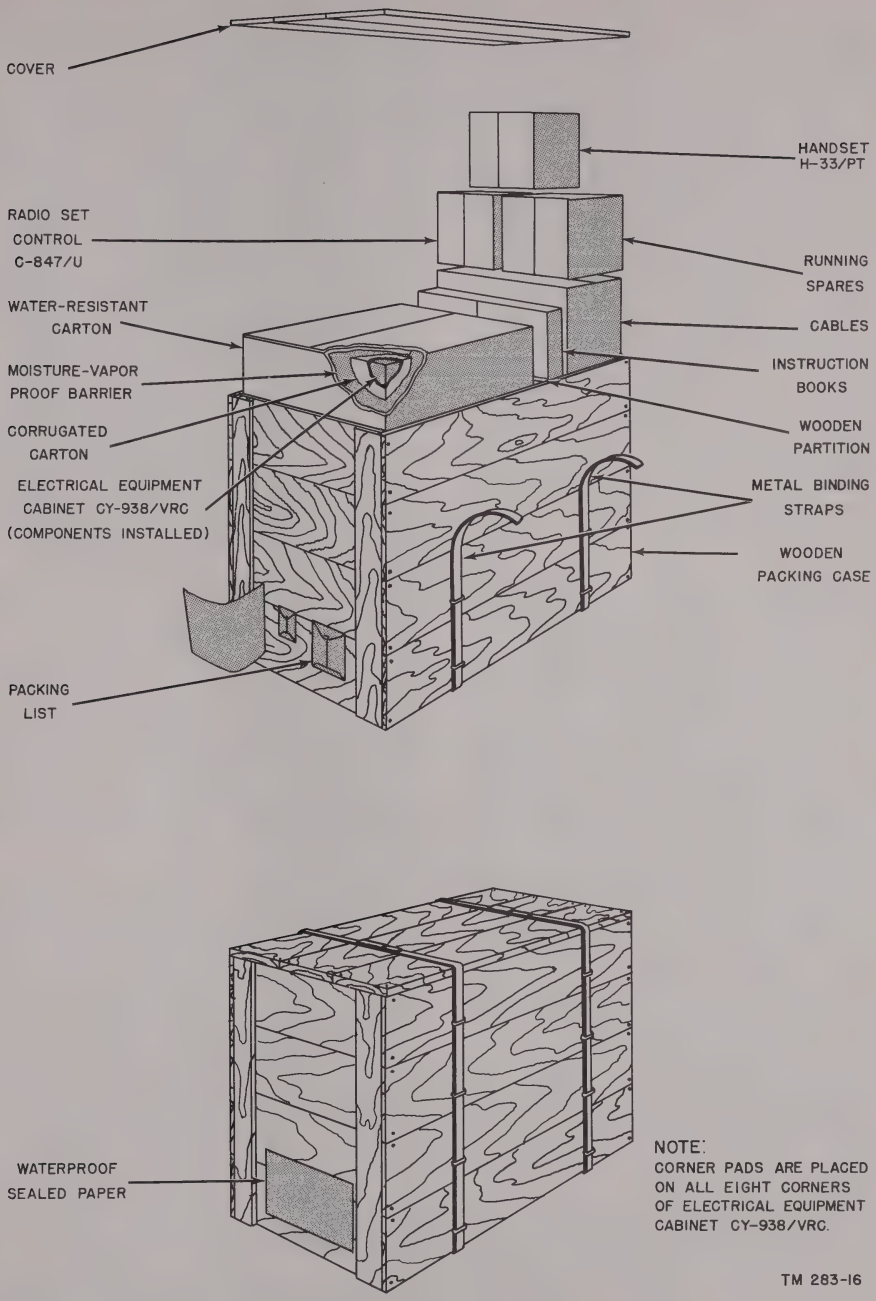


Figure 15. Radio Set AN/VRC-6(*), packing and packaging.

Each wire of the cable is marked with a metal tag bearing a number. The numbers match terminal numbers of terminal boards TB804 and TB805. Connect each wire to its mating terminal on these boards. The heavy braided lead should be secured under the screw marked GND. Feed the control end of the cable, which has pin connectors, through the hole provided in the bottom of Radio Set Control C–847/U. The ends of these wires also are marked with metal bands and indicating numbers. Plug each pin connector into its mating jack on terminal boards TB1501 and TB1502 in the control unit. After making these connections, replace the rear covers on the control unit and cabinet.

Note. When only one crystal is available for Radio Transmitter T–208/U, place it in the frequency #1 crystal socket. Connect both leads 5 and 6 of the control cable from Radio Set Control C–847/U to terminal 5 of TB804. This permits the transmitter to operate in either position of the frequency selector switch.

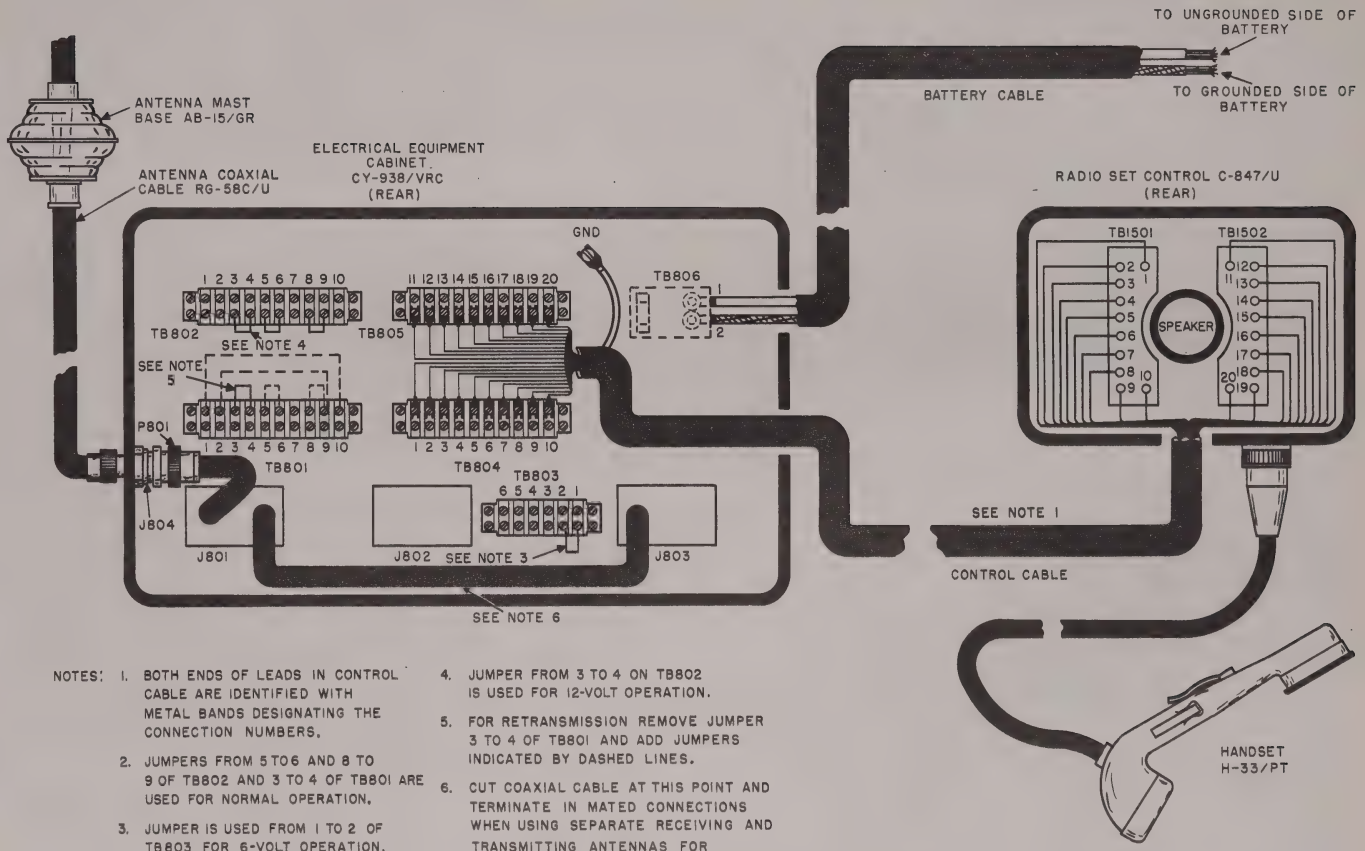
e. Retransmission Connections. When retransmission operation is required, it is necessary to use separate antennas for the receiver and transmitter and to plug a relay (K271) into the receiver. The relay is not supplied with the equipment, but must be ordered through normal supply channels. It is also necessary to place jumper connections properly in Electrical Equipment Cabinet CY–938/VRC and Radio Receiver R–257/U to permit the audio output of the receiver to modulate the transmitter and to turn the transmitter on when receiving a signal for retransmission. In the cabinet, remove the jumper from terminals 3 and 4 of TB801 and connect jumpers between terminals 1 and 10, 5 and 6, 2 and 9, and 8 and 9 of TB801. Cut the coaxial cable between J801 and J803 at its approximate midpoint, and install mating connectors on each lead to allow quick change-over from normal to retransmission operation. Connect the cable end from J803 to a separate antenna. In the receiver (fig. 61), remove the end of the jumper connected to terminal 9 of TB251 and connect it to terminal 11 of TB251.

f. Battery Polarity. Be careful when connecting the power cable to the power source. Connect the grounded lead of the power cable to the grounded side of the power source. Connect the ungrounded lead of the power cable to the ungrounded side of the power source. Provision is made in Radio Set AN/VRC–6(*) to operate when either the positive or the negative terminal of the vehicle battery is grounded to the chassis. Polarity of the battery does not affect any of the components except the transmitter power supply. If the output of the transmitter power supply dynamotor is not of the correct polarity, a negative high voltage will be applied to the transmitter instead of a positive voltage. This can be remedied by reversing the output connections of the dynamotor. To do this, it is necessary to remove the transmitter power supply from the cabinet, remove its top cover, and reverse the plug connectors located at the rear of the dynamotor (fig. 31). After changing the polarity, replace the power supply. The polarity can be checked at the front panel of the power supply by placing a d-c voltmeter across the terminals marked −25V and +380V with the positive terminal of the meter at the +380V terminal. If the voltmeter reads in a positive direction, the polarity is correct.

27. Installation of Equipment

a. General. There are two methods of mounting Radio Set AN/VRC–6(*). The method in which the front panels of the components are facing upward will be called the vertical mounting, and the method with the front panels of the components facing to the side will be called horizontal mounting. The two methods of mounting are shown in figure. 18.

b. Installation of Electrical Equipment Rack MT–1236/VRC. Electrical Equipment Rack MT–1236/VRC is installed in a vehicle where a mounting surface is available in a suitable location. Locate the rack in such a way that there will be enough surrounding space to gain access to both the front and rear of Electrical Equipment Cabinet CY–938/VRC. In some vehicles the mounting holes will be drilled and threaded. In most vehicles, however, it will be necessary to drill and tap the holes. Make a template of paper or cardboard and use it as a guide in spacing the holes correctly. The dimensions are shown in figure 17. Six holes are sufficient for securing the rack. Use ¼-inch bolts and lock washers. Nuts must be used on the other side of the mounting surface if the holes cannot be threaded.



NOTES:
1. BOTH ENDS OF LEADS IN CONTROL CABLE ARE IDENTIFIED WITH METAL BANDS DESIGNATING THE CONNECTION NUMBERS.
2. JUMPERS FROM 5 TO 6 AND 8 TO 9 OF TB802 AND 3 TO 4 OF TB801 ARE USED FOR NORMAL OPERATION.
3. JUMPER IS USED FROM 1 TO 2 OF TB803 FOR 6-VOLT OPERATION, AND FROM 2 TO 3 OF TB803 FOR 24-VOLT OPERATION.
4. JUMPER FROM 3 TO 4 ON TB802 IS USED FOR 12-VOLT OPERATION.
5. FOR RETRANSMISSION REMOVE JUMPER 3 TO 4 OF TB801 AND ADD JUMPERS INDICATED BY DASHED LINES.
6. CUT COAXIAL CABLE AT THIS POINT AND TERMINATE IN MATED CONNECTIONS WHEN USING SEPARATE RECEIVING AND TRANSMITTING ANTENNAS FOR RETRANSMISSION.

Figure 16. Radio Set AN/VRC-6(*), connections.

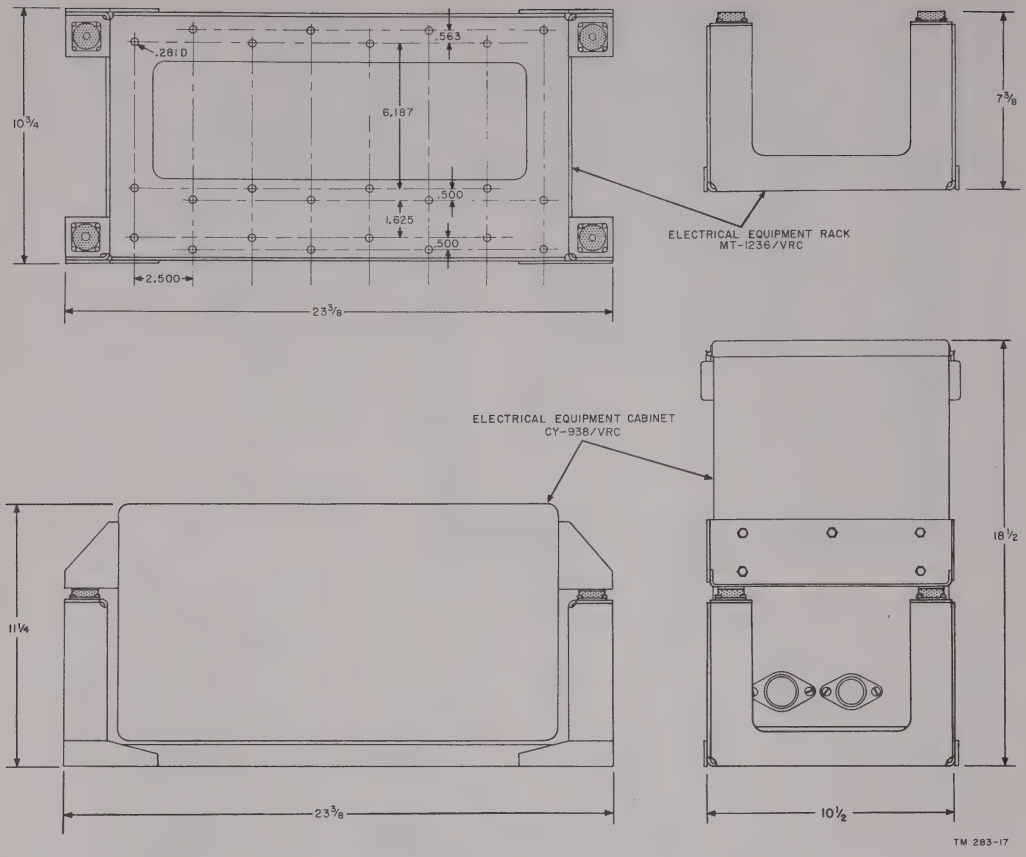


Figure 17. Electrical Equipment Rack MT–1236/VRC and Electrical Equipment Cabinet CY–938/VRC, dimensional drawing.

c. Installation of Electrical Equipment Cabinet CY–938/VRC. Before Electrical Equipment Cabinet CY–938/VRC is installed, make the proper wiring connections as described in paragraph 26. To do this it will be necessary to remove the two covers from the cabinet. The cover of the cabinet which covers the terminal boards will be referred to as the rear cover. An identical cover, which covers the installed components, will be referred to as the front cover. Replace the rear cover on the cabinet when wiring connections have been made. The cabinet is installed on Electrical Equipment Rack MT–1236/VRC and is secured by means of four bolts. The necessary bolts, nuts, and washers are supplied with the cabinet as hardware. The two side brackets on the cabinet must be fastened in the correct position, depending on the position in which the cabinet is to be mounted. The two methods of mounting are shown in figure 18. The two brackets are held by five bolts, each of which is screwed into the threaded holes in each side of the cabinet. The bracket, installed for vertical mounting, is shown in figure 5. The bracket mounting positions are shown in figure 19.

d. Installation of Mounting Bracket for Radio Set Control. The mounting bracket for the radio set control has three mounting holes. These holes match the three holes provided on the side of Electrical Equipment Cabinet CY–938/VRC when the cabinet is mounted vertically. The bracket can be mounted on some other surface if a longer control cable is used. When the bracket is installed on another surface, three mounting holes must be

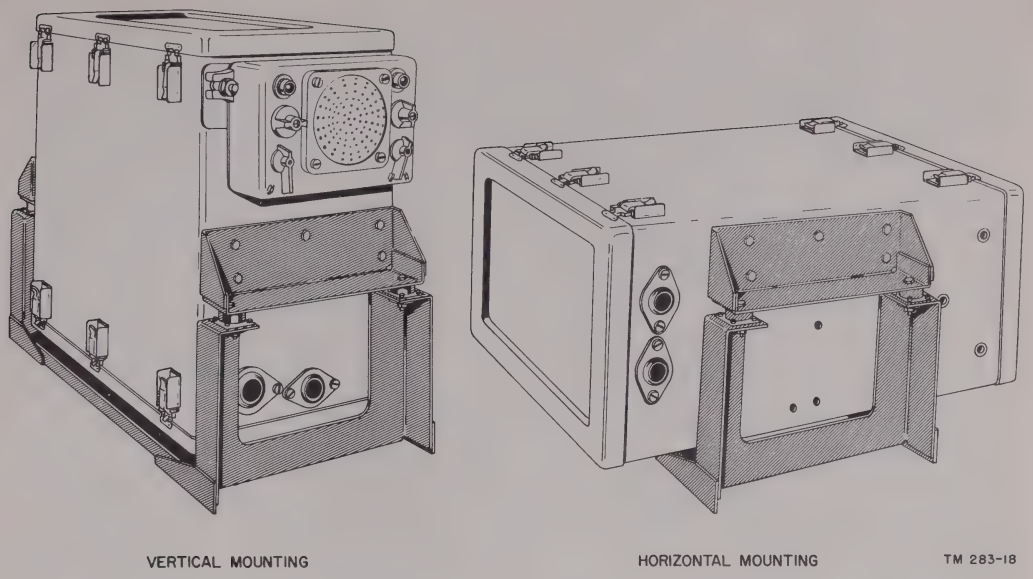


Figure 18. Electrical Equipment Cabinet CY–938/VRC, methods of mounting.

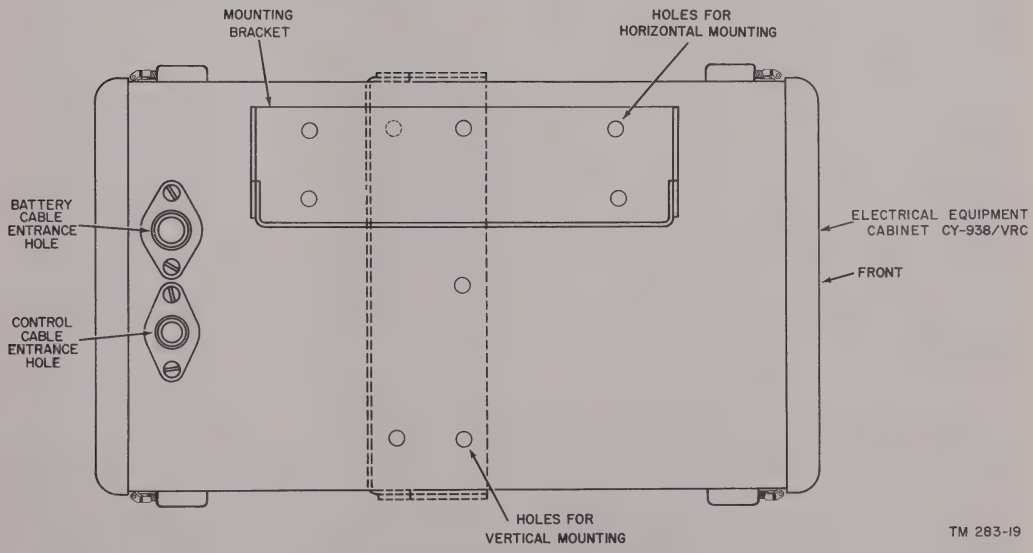


Figure 19. Electrical Equipment Cabinet CY–938/VRC, bracket installation.

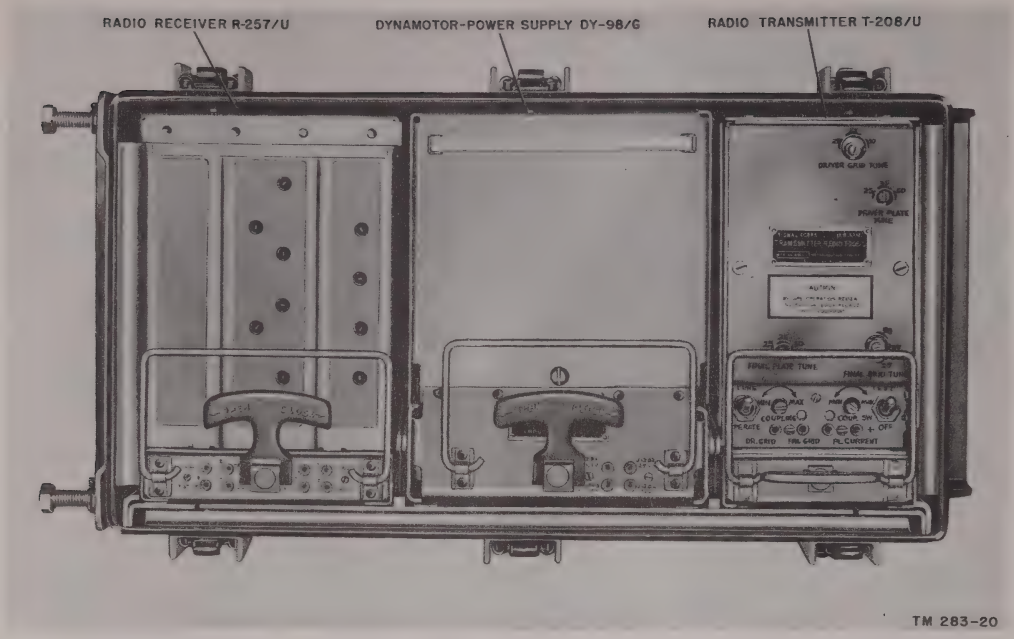


Figure 20. Electrical Equipment Cabinet CY–938/VRC, with components installed.

drilled. Make sure that the bracket is placed so that there are no obstacles encountered when attaching the control. The bracket is supplied with the installation kit when necessary.

e. Installation of Radio Set Control C–847/U. Remove the rear cover from Radio Set Control C–847/U by unscrewing the six screws. Make the proper control cable connections before installing the unit on Electrical Equipment Cabinet CY–938/VRC. Refer to the instructions given in paragraph 26 to make these connections. Replace the cover on the control unit. Place the radio set control unit flush against the control bracket so that the two flanges aline with the studs on the bracket. Place washers over the studs; then secure the control with two nuts.

f. Installation of Handset Holder. The handset holder consists of an L-shaped bracket and a clip assembly, and is packed with the spare parts kit. The clip can be used separately or in conjunction with the bracket, depending on the installation. When using both parts, the clip is fastened to the bracket by means of two holes provided in the bracket. The clip or clip and bracket assembly can be mounted at any convenient location consistent with the length of the control cable.

g. Assembly of Components in Electrical Equipment Cabinet CY–938/VRC. Place the rear of the component on the rails in the proper section of the cabinet and slide it into the cabinet until the plug on the component and the jack on the cabinet are engaged; then secure it in place by turning the lock-in rod handle 360° in a clockwise direction. Place the handle in an upright position flush against the front panel of the component. After following this procedure for each component, replace the front cover on the cabinet. Figure 20 shows the components installed in the cabinet.

h. Antenna Installation. Vehicular installations require the use of Mast Base AB–15/GR (fig. 11). The location of the mast base, in most cases, is determined by the vehicle. In general the mast base should be placed as high as possible on the vehicle. After the location of the antenna is determined and after the mounting hole is drilled, install the mast base and antenna in accordance with the following instructions:

(1) Place one large rubber washer and the upper insulator over the mounting hole.

(2) Place the two small washers on the stem of the mast base body.

(3) Insert the mast base body into the hole in the upper insulator.

(4) Place the other large rubber washer on the lower insulator.

(5) The ground ring strap and hose clamp supplied with the mast base are not required for wire lead-ins.

(6) Insert the lower insulator into the mounting hole from underneath.

(7) Assemble the mast base by holding the lower insulator and turning the mast base body until the mast base is secure.

(8) Screw together the mast sections which are used for the desired frequency as indicated in paragraph 17, then turn the assembly into the mast base.

(9) To attach the antenna lead-in to the mast base, tin the end of the wire lead-in with solder and attach it to the binding post on the lower insulator. Attach the other end of the lead-in to jack J804 located on Electrical Equipment Cabinet CY–938/VRC.

28. Service Upon Receipt of Used or Reconditioned Equipment

a. Refer to the instructions given in paragraphs 9 and 25 when repacking used or reconditioned equipment.

b. If used equipment is received for service, check for tags or other sources of information regarding the condition of the equipment. When the condition is doubtful and no information is available, perform the final testing procedures described in chapter 5. A thoroughly reconditioned piece of equipment may be considered to be in the same condition as new equipment and instructions for the operation of new equipment may be followed.

Section II. CONTROLS AND INSTRUMENTS

29. Controls and Their Uses

The controls used for normal operation after the radio set is installed and initially operated are located on Radio Set Control C–847/U. These controls are not complicated; however, an understanding of their functions will enable the operator to take advantage of the service that can be provided with proper control settings. The other controls and test points are located on the transmitter, transmitter power supply, and receiver. They are used mainly in checking the radio set for proper operation, initial tune-up procedures, and maintenance procedures.

30. Radio Set Control C-847/U Controls (fig. 8)

Control	Function
VOLUME-OFF (S1501) switch	Turns on the power to the radio set and controls the volume level to the handset and speaker through an attenuator pad. Four volume levels are available.
SPKR ON-OFF (S1502) switch	Connects the speaker in the ON position. In the OFF position disconnects the speaker and replaces it with a loading resistor. The switch is spring loaded and must be held in the OFF position.
POWER indicator (I 1501)	Lights whenever the VOLUME switch is in any position but OFF; indicates that power is applied to the receiver.
TRANSMIT indicator (I 1502)	Lights when the push-to-talk switch on the handset is closed; indicates that the transmitter is in operation and the receiver is disabled.
SQUELCH ON-OFF control (R1509) and switch (S1504)	Disables the receiver squelch circuit with the SQUELCH control in the OFF position. In other positions the control sets the *threshold* of squelch operation.

30. Radio Set Control C-847/U Controls (fig. 8) (contd)

Control	Function
FREQ 1-2 switch (S1503)	Selects either of two preset transmitter frequencies. The selection is made by supplying filament power only to the transmitter oscillator being used.
HANDSET connector (J1501)	Is located on the bottom of the control unit and provides connections between the handset and the receiver and transmitter.
Speaker	Enables the operator to hear incoming signals without having to hold the handset to his ear. This feature is necessary while the vehicle is in motion or when more than one person desires to listen.

31. Radio Transmitter T-208/U Controls (fig. 21)

Control	Function
TEST-OFF switch (S301)	In the TEST position energizes a relay in the transmitter power supply to provide power for the transmitter. In the OFF position, power is applied to the transmitter by operation of the push-to-talk switch on Handset H–33/PT.
TUNE-OPERATE switch (S302)	In the TUNE position reduces screen voltage applied to the driver/doubler and the power-amplifier tubes. In the OPERATE position allows normal screen voltage to be applied to the above tubes.
DRIVER GRID TUNE 25-35-50 control (C337)	Tunes the driver/doubler grid tank circuit to resonance.
DRIVER PLATE TUNE 25-35-50 control (C343)	Tunes the driver/doubler plate tank circuit to resonance.
FINAL GRID TUNE 25-35-50 control (C345)	Tunes the grid tank circuit of power-amplifier tubes V309 and V310 to resonance.
FINAL PLATE TUNE 25-35-50 control (C354)	Tunes final tank circuit to resonance.
COUPLING MAX-MIN control (C355)	Varies the coupling between the power-amplifier plate tank and the filter network.
COUP. SW. MAX-MIN control (S303)	Acts as a loading adjustment in conjunction with C355.
DR. GRID jack (J304)	Test point for checking grid voltage of the driver/doubler stage during tuning procedure.
FIN. GRID jack (J305)	Test point for checking grid voltage of the power amplifier during tuning procedure.
PL. CURRENT jacks (J306 and J307)	Test points for checking plate current of the power-amplifier stage during tuning procedure.
DEVIATION LEVEL control (R354, not accessible from front panel)	Controls the amount of deviation of the transmitted signal by varying the amount of audio applied to the modulator.
FREQ 1 control (C304, not accessible from front panel)	Provides fine tuning adjustment of FREQ 1 oscillator V301.
FREQ 2 control (C303, not accessible from front panel)	Provides fine tuning adjustment of FREQ 2 oscillator V302.

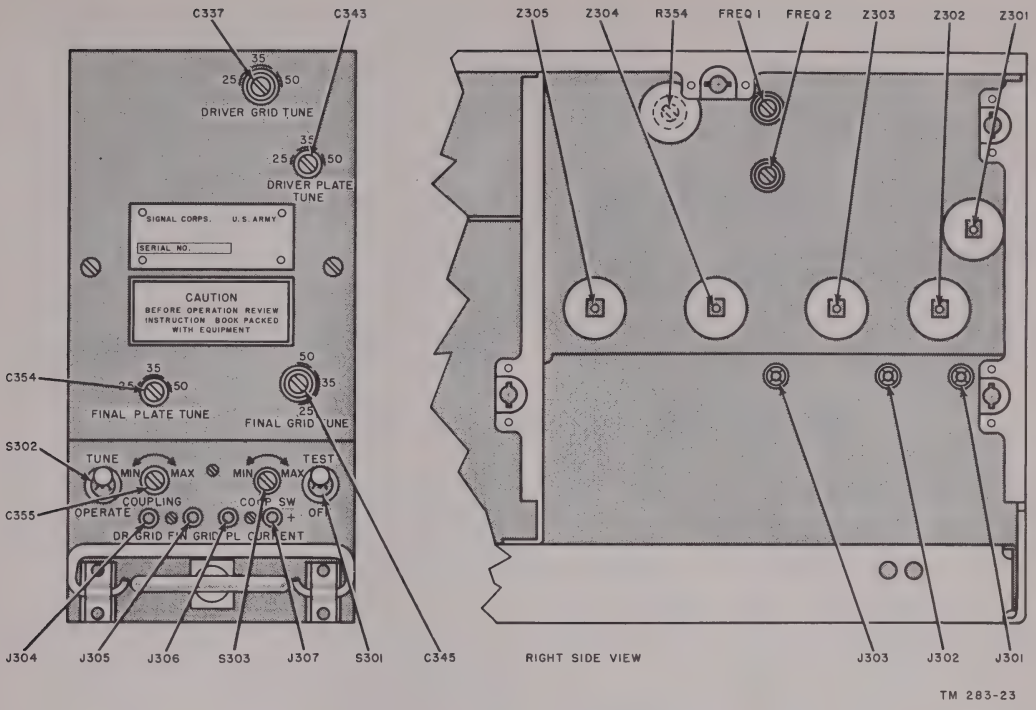


Figure 21. Radio Transmitter T–208/U, test points and alinement locations.

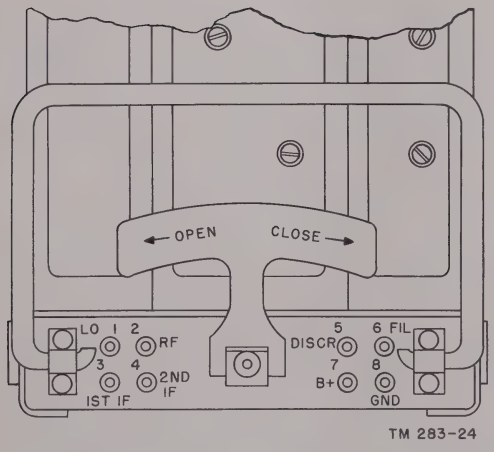


Figure 22. Radio Receiver R–257/U, front panel test points.

32. Radio Receiver R-257/U Test Points
(fig. 22)

Test point	Function
1–LO jack	Used to measure d-c voltage at the control grid of the first mixer tube V203.
2–RF jack	Used to measure d-c voltage at the control grid of 7.8-mc amplifier tube V51.
3–1ST IF jack	Used to measure d-c voltage at the control grid of first 455-kc i-f (intermediate frequency) amplifier tube V81.
4–2ND IF jack	Used to measure d-c voltage at the control grid of fifth 455-kc i-f amplifier tube V85.
5–DISCR jack	Used to measure d-c output of the discriminator circuit.
6–FIL jack	Used to check the 1.4-volt d-c filament voltage.
7–B+ jack	Used to check the +145-volt d-c plate supply voltage.
8–GND jack	Provides a common ground connection for external meter measurements.

33. Dynamotor-Power Supply Test Points
(fig. 23)

Test point	Function
1.3V jack	Used to test 1.3-volt filament supply.
−25V jack	Used to test −25-volt bias supply.
+225V jack	Used to test +225-volt supply.
+380V jack	Used to test +380-volt supply.

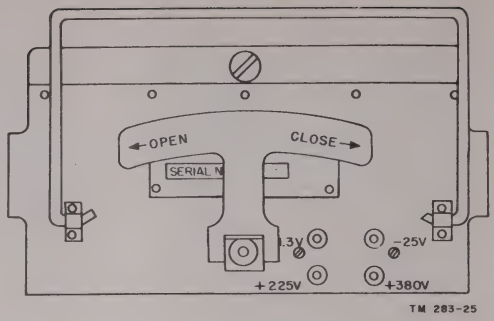


Figure 23. Dynamotor-power supply, front panel test points.

Section III. OPERATION UNDER USUAL CONDITIONS

34. Starting Procedure

a. Preliminary. Set the controls on Radio Set Control C–847/U as follows:

Control	Position
SPKR ON-OFF switch	ON
VOLUME-OFF switch	OFF
FREQ 1-2 switch	1 or 2, depending on frequency desired
SQUELCH ON-OFF switch	OFF

b. Starting. Rotate the VOLUME-OFF switch to the third position clockwise. The POWER pilot light will light and a signal or noise will be heard from the handset or speaker within 15 or 20 seconds. If noise is not heard, or the pilot light does not light, refer to the equipment performance checklist (par. 57), to determine the reason. When indications are obtained that the receiver is in working order, further operation can be accomplished.

35. Push-to-talk Operation

a. For push-to-talk operation, it is only necessary to depress the push-to-talk switch on Handset H–33/PT and speak into the handset microphone. When the switch is released, the transmitter is turned off automatically and the receiver is allowed to function. The volume to the handset and speaker can be regulated by setting the VOLUME-OFF switch to a position between OFF and full volume. The speaker is on at all times unless the SPKR switch is held in the OFF position. The operation of the handset is the same as that of a conventional telephone except for the use of a switch for transmission.

b. The transmission frequency can be changed a preset amount by placing the FREQ 1–2 switch in the alternate position.

36. Squelch Operation

The receiver may be operated either with or without squelch control. When the SQUELCH ON-OFF control is in the OFF position, the receiver operates at all times. When the SQUELCH ON-OFF control is turned counterclockwise, it opens a switch and allows the SQUELCH threshold to be varied. The effect the squelch circuit has on the receiver is to quiet the noise output from the speaker or handset when no signal is being received. When a signal is picked up by the receiver, the squelch circuit operates to allow signals to pass through the receiver. The SQUELCH ON-OFF control permits adjustment for various signal and noise levels. The control is adjusted as follows:

a. Turn the SQUELCH ON-OFF control to its fully clockwise (OFF) position and note whether a signal or just noise is being received.

b. Wait until no signal is heard, then advance the SQUELCH ON-OFF control counterclockwise until the background noise disappears. Wait for a signal to come on. The signal should be

ordered, if possible, from a station at a distance of several miles from the receiver at a frequency to which the receiver is tuned.

c. The signal should unsquelch the receiver during the period of transmission from the other station. The receiver should squelch as soon as no carrier is being received.

d. If the receiver will not squelch, the SQUELCH ON-OFF control may have to be advanced further. When the noise level is high and the signal level is low, it may be impossible to use squelch operation. Under these conditions, reception can be carried on with the SQUELCH ON-OFF control in the OFF position. The speaker and handset then will operate continuously during reception.

37. Retransmission Operation

It is possible to receive a signal at the receiver and retransmit that same signal on another frequency. To do this, the audio output of the receiver must be fed into the audio input of the transmitter. This is done by making a few jumper connections in Electrical Equipment Cabinet CY–938/VRC and Radio Receiver R–257/U as described in paragraph 26. Relay K271 must also be plugged into the receiver (par. 26). After the connections have been made, the starting procedure in paragraph 34, and the squelch adjustments in paragraph 36, should be followed. The receiver and transmitter now will operate only when a signal is being received. Since, during retransmission operation, the squelch circuit turns the transmitter on only when a signal is being received, the squelch circuit must be used or the transmitter will operate continuously. The speaker on Radio Set Control C–847/U will monitor the receiver audio output. If break-in with the handset is not desired, it should be disconnected from the control jack.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

38. General

The operation of Radio Set AN/VRC–6(*) may be difficult in regions where extreme cold, heat, humidity and moisture, sand conditions, etc., prevail. In the following paragraphs, instructions are given on procedures for minimizing the effect of these unusual operating conditions.

39. Operation in Arctic Climates

Subzero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Instructions and precautions for operation under such adverse conditions follow:

a. Handle the equipment carefully.

b. Keep the equipment warm and dry if possible.

c. Always take precaution to prevent cold air from coming into contact with heated tubes. A sudden draft of cold air is often sufficient to shatter the glass envelope of a heated tube.

d. Heavy coatings of frost will gather on mouth-type microphones in extreme cold weather when the handset is used in the open air. The operator's breath will cause frost to form in the small holes of the cap; this will affect transmitter modulation. Rubber and fabric diaphragms have been designed to protect some types of handsets; use them when available. Have a spare handset ready, if possible, in case the one in use fails to function properly when the above conditions prevail.

40. Operation in Tropical Climates

When operating equipment in tropical climates, high humidity will cause condensation of moisture on the equipment whenever the temperature of the equipment becomes lower than the ambient air. Dry the equipment thoroughly before operating it.

41. Operation in Desert Climates

a. Conditions similar to those encountered in tropical climates often prevail in desert areas. Use the same measure to insure proper operation of the equipment.

b. The main problem which arises with equipment operation in desert areas is the large amount of sand or dust which enters the moving parts of radio equipment, such as motors and controls. Be careful to keep the equipment as free from dust as possible. Make frequent preventive maintenance checks. Pay particular attention to the condition of the lubrication of the equipment. Excessive amounts of dust, sand, or dirt that comes into contact with oil and grease result in grit, which will damage the equipment.

Section V. PRESETTING OR INITIAL ADJUSTMENT OF EQUIPMENT

42. General

a. Normally, Radio Set AN/VRC–6(*) operates at a frequency which is set up at the time of installation. It is possible to change both the receiving and transmitting frequencies as desired within a range of 25 to 50 mc. The two frequencies provided in the transmitter always must be within 250 kc of each other. Therefore, if one frequency is changed and the maximum separation is exceeded, the other frequency must be changed also. This is necessary because the transmitter will not operate efficiently when oscillator frequencies are too widely separated. There are three ways of accomplishing the changes in frequency and each requires a different amount of skill. These methods are as follows:

(1) Replace both the receiver and transmitter with units which are tuned to the new frequency.

(2) Replace the receiver R-F AMPL 25–50 MC and LOCAL OSC 25–50 MC plug-in units, and the transmitter, with units preset to the new frequencies.

(3) Retune the above plug-in units and the transmitter to the new frequencies.

b. The first two methods are not complicated and can be done by an operator without extensive radio experience. The last method requires adjustment and a radio repairman with knowledge of the techniques used in performing alinement of the receiver and transmitter. In paragraphs 43 and 44, the alinement procedures are described; however, more details can be found on these procedures by referring to the instruction book covering the specific units to be adjusted.

c. When adjusting the transmitter to a new frequency (or frequencies), do not disturb or alter the oscillator circuit. Alteration or disturbing of the oscillator circuit includes changing the oscillator tube, and moving leads or adjustments used in the frequency setting procedure. If the circuit is disturbed or altered, the transmitter may have to be completely realined. For this information, refer to the transmitter instruction book.

d. Changing the receiver frequency is more difficult than changing the transmitter frequency, since the receiver must be tuned exactly to a transmitter which may be a considerable distance away. Normally, an accurately calibrated signal generator is used to provide a signal simulating that of the distant transmitter. This provides a coarse tuning adjustment to tune the receiver to the approximate frequency. After the coarse tuning procedure is completed, it is necessary to *warp* the crystal in the first high-frequency oscillator to assure accurate tuning of the receiver to the desired transmitter frequency. Without the *warping* of the oscillator crystal, reduced range of reception and distortion in the audio output may result.

e. It is necessary, for complete adjustment of either the transmitter or receiver, to remove these components from Electrical Equipment Cabinet CY–938/VRC. Connection to the component is made by means of a patch cord, which is available as an issued item at the maintenance depot. Normally, just one component (receiver or transmitter) is adjusted at a time. Access to the receiver tuning adjustments can be obtained through holes in the front of the receiver (fig. 7).

f. A VTVM (vacuum-tube voltmeter) and signal generator are required for changing the receiver frequency; a VTVM and frequency meter are required for changing the frequency of the transmitter. The signal generator and frequency meter must be capable of operating within the frequency range of 25–50 mc. Use the following test equipment and associated publications:

Test equipment	Publication
Electronic Multimeter TS–505/U or equal (VTVM)	TM 11–5511
Multimeter TS–352/U	TM 11–5527
Signal Generator TS–588/U	TM 11–5018
Frequency Meter TS–174B/U	TM 11–5044

43. Changing Transmitter Frequency

a. Preliminary Procedure. Before proceeding with the frequency changing procedure, the following preliminary steps should be taken:

(1) To release the transmitter from Electrical Equipment Cabinet CY–938/VRC

turn the hold-in lock counterclockwise. The transmitter then may be pulled out by using the handle.

(2) Remove the right and left side dust covers from the transmitter. Be sure that all tubes are in place (fig. 30).

(3) A patch cord is required to complete the connection when the transmitter is removed from Electrical Equipment Cabinet CY–938/VRC. This cord is described in paragraph 45. Connect the patch cord from jack J801 in the cabinet to plug P301 on the rear of the transmitter.

(4) Connect the antenna to antenna plug P801 on Electrical Equipment Cabinet CY–938/VRC.

(5) Determine the correct crystal frequency. The two preset operating frequencies of the transmitter may not differ by more than 250 kc. After selecting two operating frequencies which meet this requirement, choose the correct crystal frequency by means of the following formula:

$$\text{crystal frequency} = \frac{\text{operating frequency.}}{16}$$

Example:

F_1 = desired operating frequency = 30 mc.

F_2 = alternate operating frequency = 30 $\pm$ .25 mc = 29.75 or 30.25 mc.

F_c = crystal fundamental frequency.

$$F_c = \frac{F_1}{16} = \frac{30{,}000 \text{ kc}}{16} = 1875.0 \text{ kc.}$$

$$F_c = \frac{F_2}{16} = \frac{29{,}750 \text{ kc}}{16} = 1859.375 \text{ kc.}$$

To maintain accuracy of the operating frequency, carry division out to three places to the right of the decimal point. The above example shows the maximum allowable frequency difference between the two operating frequencies. Actually, more efficient transmitter operation is obtained when the two frequencies are closer together.

(6) Install the required crystals. To do this, first unplug the entire crystal oven assembly E301. Remove the three screws which secure the cover of the crystal oven to the socket, unplug the heater and thermostat element from the socket, and insert the correct crystals into the socket base. Reassemble in the reverse order.

(7) Install the proper coil (L316, L317, or L319) in the final tank circuit. The 9-turn coil (L319) is used for the 25 to 32-mc band; the 6-turn (L317) coil is used for the 32 to 40-mc band; the 5-turn coil (L316) is used for the 40 to 50-mc band. The proper coil for the band in operation is fastened to the terminal board by two No. 6-32 screws, one at each end. The coils not in use are stored on the left-side dust cover.

(8) Install the proper jumper straps for the antenna filter (Z309). Solder the straps to the terminal strip connectors as indicated in the following chart:

Freq (mc)	Jumper strap connections		
25-32	2-3 2-1	4-6 4-5	9-8 9-10
32-40	2-3	4-6	9-8
40-50	2-1	4-5	9-10

(9) Set the FREQ 1 and FREQ 2 capacitors (C303 and C304) on the transmitter chassis (fig. 21) to their mechanical midpoints.

(10) Turn the VOLUME-OFF switch on Radio Set Control C–847/U clockwise to apply power to the heating element of the crystal oven. Allow at least 15 minutes heating time before performing step *b*(7) outlined in subparagraph below, in order to obtain a stable crystal temperature.

(11) Turn the FREQ 1-2 switch on Radio Set Control C–847/U to either the 1 or the 2 position to apply filament power to the desired oscillator.

b. General. To tune the transmitter, a VTVM and frequency meter (par. 42*f*) are required. Refer to figure 21 for test and alinement points.

Caution: During alinement, do not continuously operate the transmitter too long. This will prevent overheating of the transmitter-power supply dynamotor.

(1) Set the tuning screws of Z301, Z302, Z303, Z304, and Z305 (on the chassis) to approximately the correct frequency as indicated in the following chart:

Core position in 16ths of an inch	Final output in mc (approx)	Core position in 16ths of an inch	Final output in mc (approx)
2	25.0	7	35.0
3	26.5	8	37.5
4	28.0	9	40.0
5	30.0	10	45.0
6	32.5	11	48.0
		12	50.0

Note. The core position is measured from the top of the tension nut to the top of the slug screw.

(2) Set the DRIVER GRID TUNE, DRIVER PLATE TUNE, FINAL GRID TUNE, and FINAL PLATE TUNE controls on the front panel to the approximate frequency.

(3) Set COUP. SW control S303 and COUPLING capacitor C355 on the front panel to MIN.

(4) Throw TUNE-OPERATE switch S302 on the front panel to the TUNE position.

(5) Throw TEST-OFF switch S301 on the front panel to the OFF position.

(6) Rotate the VOLUME-OFF switch on the control unit clockwise to turn on the power. Wait 15 minutes for stabilization of the circuits.

(7) Throw TEST-OFF switch S301 to the TEST position.

(8) After the steps outlined in subparagraphs (1) through (7) have been made, refer to the following tables to tune the transmitter properly. Use the VTVM.

Note. The maximum reading (negative) should be within ±20 percent of the listed normal reading. If it cannot be obtained, refer to the trouble-shooting section of this instruction book.

(9) Check the transmitter output frequencies by placing a wire connected to the output terminal of a frequency meter near the antenna circuit (see instructions packed with the frequency meter).

(10) If either frequency is incorrect adjust the FREQ 1 or FREQ 2 capacitor (fig. 21) until the correct frequency is indicated on the frequency meter.

(11) Turn the TEST-OFF switch to the OFF position.

(12) Disconnect the meters, reassemble the dust covers, and install the transmitter in the cabinet.

TABLE I
MULTIPLIER AND DRIVER STAGE TUNING

Test point	Normal reading (volts)	Adjustment
J301 (chassis)	−20	Adjust slug tuning screw on Z301 for maximum voltmeter reading.
J302 (chassis)	−25	Adjust slug tuning screw on Z302 for maximum voltmeter reading.
J303 (chassis)	−24	Adjust slug tuning screw on Z303, then on Z304 for maximum reading. Repeat the adjustments.
DR. GRID (J304, front panel)	−65	Adjust DRIVER GRID TUNE 25-35-50 control (capacitor C337, front panel), then tuning slug screw on Z305 for maximum voltmeter reading. Repeat the adjustments.
FIN. GRID (J305, front panel)	−31	Adjust FINAL GRID TUNE 25-35-50 control (capacitor C345, front panel), then DRIVER PLATE TUNE 25-35-50 control (capacitor C343, front panel), for maximum voltmeter reading. Repeat the adjustments.

TABLE II
FINAL STAGE TUNING

Voltmeter selector switch	Test point		Normal reading	Adjustment
	From	To		
				Caution: Be careful when measuring plate current, since *both* test points are at 380 volts above ground. If the test meter has a metallic case, be sure to insulate the case from ground, and do not touch the case while making measurements.
0-1.5 v d-c	PL. CURRENT (J306, front panel)	PL. CURRENT (J307, front panel)	1.3 volts	Adjust FINAL PLATE TUNE 25-35-50 capacitor, C354 (front panel), for minimum voltmeter reading. With COUP. SW. MIN-MAX control S303 at MIN, adjust COUPLING MIN-MAX capacitor C355 until a maximum reading is obtained. Readjust C354 for minimum and C355 for maximum. If the list reading cannot be obtained, or is too low, turn S303 to the next position above MIN and repeat the procedure outlined above. Continue turning S303 toward MAX until the proper reading is obtained.

Note. It may be necessary to retune the grid and plate circuits slightly after the dust covers are reassembled. It may also be necessary to readjust the final plate tuning and coupling controls (par. 43*b*(8), table II) when the transmitter is reinstalled in the cabinet and connected to the antenna in the vehicle. Since it is inconvenient to use the VTVM in a vehicle, use a meter of at least 1000 ohms/volt sensitivity (par. 42*f*) for the final adjustment.

44. Changing Receiver Frequency

a. Preliminary Procedures Before Changing Receiver Frequency. The following preliminary steps should be taken:

(1) Release the receiver from Electrical Equipment Cabinet CY–938/VRC by turning the hold-in lock counterclockwise; the receiver then may be pulled out of the cabinet by using the handle located on the front panel.

(2) Remove the top cover and the plug-in assembly marked LOCAL OSC 25-50 MC. Remove the plug-in assembly shield, and reinsert the plug-in unit into the receiver.

(3) A patch cord is required to complete the connections from the receiver to the cabinet.

(4) Determine the frequency to which the receiver is to be tuned. This information is needed when calculating the proper high-frequency oscillator crystal frequency (subpar. *b* below).

(5) Refer to figure 24 to locate the adjustment points, and to figure 34 for location of the plug-in units.

b. LOCAL OSC 25-50 MC Plug-in Unit Alinement Procedure. When a new operating frequency is to be used, high-frequency oscillator V231, doubler V232, and amplifier V233 must be retuned. The procedure consists of a rough adjustment which assures that the oscillator is operating near the desired frequency and a precise adjustment which tunes the receiver exactly to the desired signal frequency. A VTVM is connected to the front panel test points and to a terminal board in the bottom of the plug-in unit chassis during the procedure to give tuning indications. It is important that the right crystal is inserted in the crystal oven, otherwise it is not possible to properly tune the oscillator to the desired frequency. Crystal Y231 should be selected by the following formula:

$$\text{XTAL FREQ} = \frac{F_s + 7.8}{2} \text{ mc}$$

where XTAL FREQ is the frequency of the crystal which is to be found and F_s is the desired signal frequency in mc. After the correct crystal has been selected, remove crystal oven E231 (fig. 32) and insert the new crystal. Use the same procedure indicated for disassembly of the transmitter crystal oven (par. 43*a*(6)). Different frequencies, as determined by the above formula, will require different con-

nections on terminal boards TB232 and TB233, located on the under side of the chassis. These connections are made by means of solder-in jumpers between terminals. The combinations for different crystal frequency ranges are shown in figure 24. The adjustment locations can be found in figures 7 and 25. Use the following sequence of adjustments:

VTVM connection	Adjustment	Indication
None	*Z231, unscrew almost all the way counterclockwise.	None.
Terminal on TB231 to which R231 connects and GND test point (front of receiver).	*Z231	Maximum negative voltage.
R239 at terminal on TB231 and GND test point.	Z232	Maximum negative voltage.
LO and GND test points (front of receiver).	Z233 and Z234	Maximum negative voltage.

*Z231 will have to be slightly readjusted later in the procedure. Upon completion of the above adjustments, the shield should be replaced on the plug-in unit, and the unit reinstalled in the receiver. Z231 can be reached through a hole in the front of the receiver.

c. R-F AMPL 25-50 MC Plug-in Unit Alinement Procedure. The r-f and mixer stages V201, V202, and V203 must be alined to the new signal frequency. If the desired signal frequency falls within the range of 25 to 35 mc, a solder-in jumper must be connected between the two terminals on each of the five small terminal boards located on the under side of the chassis. To gain access to three of the terminal boards, a metal shield near the handle end of the chassis must be removed. If the desired frequency falls within the range of 35 to 50 mc, the jumpers must be removed from each of the five terminal boards. A VTVM is used at the receiver test points on the front panel and at terminal board TB231 (under side of plug-in chassis) for the tuning indications. The signal to which the stages are tuned is provided by a signal generator (unmodulated). Connect the signal generator to the antenna coaxial connector and set it to the desired signal frequency. Connect the VTVM between the 2ND IF and GND test points on the front of the receiver, and adjust Z201 through Z206 in sequence for maximum negative voltage. Repeat the above adjustments, at least three times, in sequence. Keep the signal generator output as low as possible, yet maintain a usable meter indication.

d. Adjusting Receiver to Transmitter Frequency. As explained in paragraph 42*d*, it is usually not possible to aline the receiver exactly to the distant transmitter frequency by the use of a signal generator. A slight adjustment of the high-frequency crystal oscillator will be necessary to aline

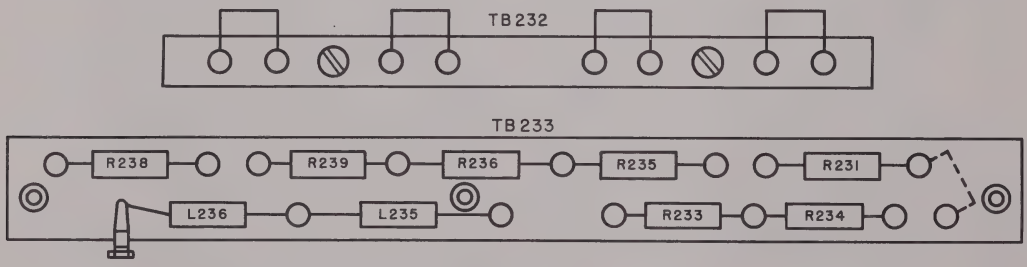

TB232
TB233
R238
R239
R236
R235
R231
L236
L235
R233
R234
NOTES:
1. FOR OPERATING FREQUENCY BETWEEN 25 AND 35.2MC, REMOVE JUMPER INDICATED BY DASHED LINES ON TB233 AND ADD JUMPERS INDICATED BY SOLID LINES ON TB232.
2. FOR OPERATING FREQUENCY BETWEEN 35.2 AND 50MC, ADD JUMPER INDICATED BY DASHED LINE ON TB233 AND REMOVE JUMPERS INDICATED BY SOLID LINES ON TB232.
TM 283-67

Figure 24. LOCAL OSC 25-50 MC plug-in unit, jumper connections.

the receiver with a signal from the distant transmitter. The procedure is as follows:

(1) Place the receiver in operation as described in paragraph 34. Be sure that the transmitter is operating on the desired signal frequency. The radio set must be connected to an antenna for this adjustment.

(2) Connect a VTVM to the receiver front panel test points marked DISCR and GND. Set the VTVM to read positive voltages.

(3) Readjust oscillator warping coil Z231 for a +1-volt reading on the VTVM.

(4) The receiver now is adjusted completely to the new operating frequency, and can be replaced in Electrical Equipment Cabinet CY–938/VRC.

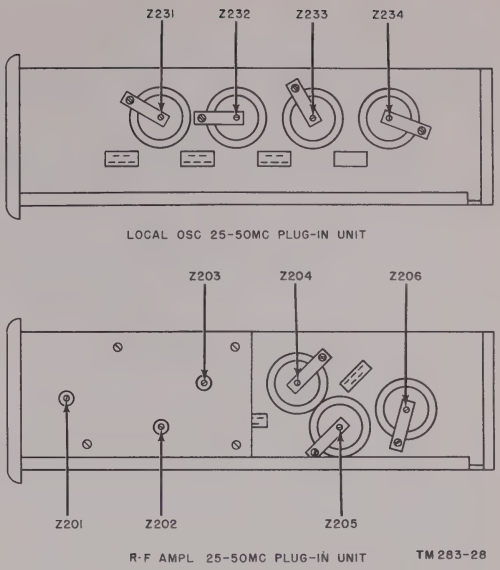


Figure 25. Radio Receiver R–257/U, alinement points.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. ORGANIZATIONAL TOOLS AND EQUIPMENT AND PREVENTIVE MAINTENANCE SERVICES

45. Special Tools Issued with Equipment

An alinement tool and five Allen wrenches are supplied with Radio Set AN/VRC–6(*). The tools found in Tool Equipment TE–41 are adequate for repair of the set. A special cable (Special Purpose Electrical Cable Assembly CX–2371/U) which is not supplied with this equipment may be used to connect the receiver, transmitter, or power supply when it is necessary to operate them outside the cabinet. The cable is 4 feet long over-all and has a male connector on one end and a female connector on the other end (fig. 26). It is useful in trouble shooting, repair, or adjustment procedures because once the component is out of the cabinet, internal measurements and adjustments of the components can be made while the radio set is in operation. The cable can be used with any of the three plug-in units because of the identical pin arrangement of their rear panel connectors.

46. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment to keep it in good working order so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from trouble shooting and repair in that its object is to prevent certain troubles from occurring. See AR 750–5.

47. General Preventive Maintenance Techniques

a. Use #000 sandpaper to remove corrosion. Never use steel wool.

b. Use a clean, dry, lint-free cloth or a dry brush for cleaning.

(1) If necessary, except for electrical contacts, moisten the cloth or brush with Solvent, Dry Cleaning (SD); then wipe the parts dry with a cloth.

(2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a cloth.

Caution: Repeated contact of carbon tetrachloride with the skin, or prolonged breathing of the fumes is dangerous. Make sure adequate ventilation is provided.

c. If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch to remove dust from inaccessible places; be careful, however, or mechanical damage from the air blast may result.

d. For further information on preventive maintenance techniques, refer to TB SIG 178.

48. Use of Preventive Maintenance Forms (figs. 27 and 28)

a. This information is presented as a guide to the individual making an inspection of equipment in accordance with instructions on DA AGO Forms 11–238 and 11–239. The decision as to which items on the forms are applicable to this equipment is a tactical decision to be made in the case of first echelon maintenance by the communications officer/chief or his designated representative, and in the case of second and third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

b. Circled items in figures 27 and 28 are partially or totally applicable to Radio Set AN/VRC–6(*). References in the ITEM block refer to paragraphs in text which contain additional maintenance information.

49. Performing Preventive Maintenance

a. Performing Exterior Preventive Maintenance.

Caution: Tighten screws, bolts, and nuts carefully. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

(1) Check for completeness and satisfactory condition of the radio set. The components of the radio set are listed in the table in paragraph 10 and are illustrated in figure 4.

(2) Check the radio set components to see that they are placed properly and have not shifted since installation (par. 24).

(3) Clean dirt and moisture from the antenna, handset, control, and cabinet (fig. 4).

(4) Check controls for binding, scraping, excessive looseness, misalinement, and positive action (fig. 8).

(5) Check the operation of the radio set for satisfactory reception and transmission (pars. 34, 35, and 36).

(6) Check the cabinet brackets, mounting rack, shock mounts, control and bracket, battery cable connections, and antenna cable connections for looseness or defects (figs. 4 and 5).

(7) Inspect the exterior of the cabinet, control, and mounts for signs of rust, corrosion, moisture, and chipped paint (fig. 5).

(8) Inspect the cables for cuts, breaks, fraying, deterioration, kinks, and strain (fig. 4).

(9) Inspect the antenna for bent or otherwise damaged posts.

(10) Inspect the pilot light jewels for dirt or cracked lenses (fig. 8).

(11) Inspect the covers of the control and cabinet for adequacy of weatherproofing.

(12) Inspect the rubber gaskets at the wire entrance holes in the cabinet and the control for deterioration or leaks (figs. 5 and 8).

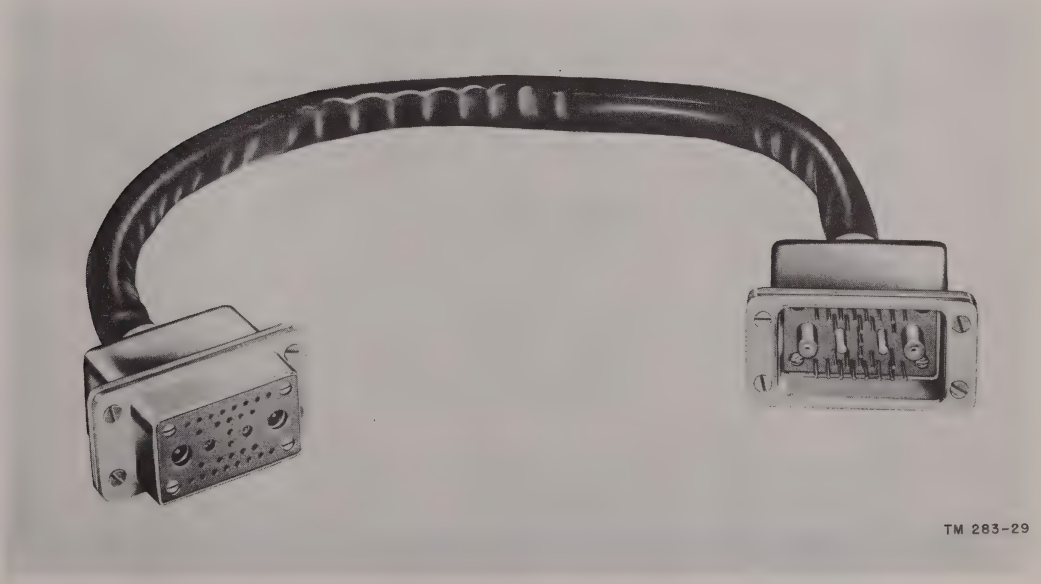


Figure 26. Special Purpose Electrical Cable Assembly CX–2371/U (patch cord, 4 feet 0 inch).

OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

DAILY

NO.	ITEM	CONDITION S	M	T	W	T	F	S
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).* PAR. 49A(1)							
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 49A(2)							
3	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS. PAR. 49A(3)							
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS. PAR. 49B(1)							
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION. PAR. 49A(4)							
6	CHECK FOR NORMAL OPERATION. PARS. 34, 35, AND 36							

WEEKLY

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
7	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR. 49A(6)		13	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.	
8	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 49A(7)		14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.	
9	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 49A(8)		15	INSPECT METERS FOR DAMAGED GLASS AND CASES.	
10	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS. PAR. 27		16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING. PAR. 49A(11)	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.		17	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWER-STATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES. PAR. 49A(10)		18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.	

19 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

DA AGO FORM 1 MAY 51 11-238 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 283-30

Figure 27. DA AGO Form 11-238.

SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE | EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (1) Defect corrected.
NOTE: Strike out items not applicable.

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).* PAR. 49A(1)		19	ELECTRON TUBES - INSPECT FOR LOOSE ENVELOPES, CAP CONNECTORS, CRACKED SOCKETS: INSUFFICIENT SOCKET SPRING TENSION; CLEAN DUST AND DIRT CAREFULLY; CHECK EMISSION OF RECEIVER TYPE TUBES. PAR. 49B(4)	
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 49A(2)		20	INSPECT FILM CUT-OUTS FOR LOOSE PARTS, DIRT, MISALIGNMENT AND CORROSION.	
3	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS. PAR. 49A(3)		21	INSPECT FIXED CAPACITORS FOR LEAKS, BULGES, AND DISCOLORATION. PAR. 49B(5)	
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS. PAR. 49B(1)		22	INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR LOOSE MOUNTINGS; BURNED, PITTED, CORRODED CONTACTS; MISALIGNMENT OF CONTACTS AND SPRINGS; INSUFFICIENT SPRING TENSION; BINDING OF PLUNGERS AND HINGE PARTS.	
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION. PAR. 49A(4)		23	INSPECT VARIABLE CAPACITORS FOR DIRT, MOISTURE, MISALIGNMENT OF PLATES, AND LOOSE MOUNTINGS. PAR. 49B(6)	
6	CHECK FOR NORMAL OPERATION. PARS. 34, 35 AND 36		24	INSPECT RESISTORS, BUSHINGS, AND INSULATORS, FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE. PAR. 49B(7)	
7	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR. 49A(6)		25	INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR CORROSION, DIRT AND LOOSE CONTACTS. PAR. 49B(8)	
8	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 49A(7)		26	CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES, AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE. PAR. 49B(9)	
9	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 49A(8)		27	INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS. PAR. 49B(10)	
10	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS. PAR. 27		28	CHECK SETTINGS OF ADJUSTABLE RELAYS.	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.		29	LUBRICATE EQUIPMENT IN ACCORDANCE WITH APPLICABLE DEPARTMENT OF THE ARMY LUBRICATION ORDER.	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES. PAR. 49A(10)		30	INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS, FOR BRUSH WEAR, SPRING TENSION, ARCING, AND FITTING OF COMMUTATOR. PAR. 49B(11)	
13	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.		31	CLEAN AND TIGHTEN CONNECTIONS AND MOUNTINGS FOR TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS. PAR. 49B(12)	
14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.		32	INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS FOR OVERHEATING AND OIL-LEAKAGE. PAR. 49B(13)	
15	INSPECT METERS FOR DAMAGED GLASS AND CASES.		33	BEFORE SHIPPING OR STORING - REMOVE BATTERIES.	
16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHERPROOFING. PAR. 49A(11)		34	INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.	
17	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.		35	INSPECT BATTERIES FOR SHORTS AND DEAD CELLS.	
18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.		36	INSPECT FOR LEAKING WATERPROOF GASKETS, WORN OR LOOSE PARTS. PAR. 8(14)	
			37	MOISTURE AND FUNGIPROOF. PAR. 8(15)	
38	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.				

DA AGO FORM 1 MAY 51 11-239 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE. 16—64382-1

TM 283-31

Figure 28. DA AGO Form 11-239.

b. Performing Interior Preventive Maintenance.

Caution: Disconnect all power before performing the following operations. Upon completion, reconnect power and check for satisfactory operation.

Note. To gain access to the interior of the cabinet, remove both covers by unfastening the trunk-type latches. If the cabinet is mounted in the vertical position, it is necessary to remove the cabinet from the mount before taking off the rear cover.

(1) Remove each component and check the tubes, fuses, vibrators, crystals, plug-in capacitors, and connectors for proper seating (figs. 29, 30, 31, 32 and 33).

(2) Inspect the cable lacing for mildew, tears, and fraying.

(3) Inspect the switches, knobs, jacks, transformers, chokes, dynamotor, filters, and relays for looseness.

(4) Check all tubes, for loose envelopes, cap connections, and insufficient socket tension. Carefully remove all dust and dirt. Check emission of all tubes that can be tested.

(5) Inspect fixed capacitors for leaks, bulges, and discoloration (see component instruction books).

(6) Check variable trimmer capacitors for dirt, moisture, misalinement of plates, and loose mountings (see transmitter instruction book).

(7) Inspect resistors, bushings and insulators for cracks, chipping, blistering, discoloration and moisture (see component instruction books).

(8) Inspect large fixed capacitors and resistors for corrosion, dirt and loose contacts (see component instruction books).

(9) Clean and tighten loose switches, terminal blocks and the interiors of the chassis and the cabinet not readily accessible (see component instruction books).

(10) Inspect terminal blocks for loose connections, cracks, and breaks (see component instruction books).

(11) Inspect the dynamotor for brush wear, spring tension, arcing, and pitting of the commutator (see transmitter power supply instruction books).

(12) Clean and tighten connections and mountings for transformers, chokes, potentiometers, and rheostats (see component instruction books).

(13) Inspect transformers, chokes, potentiometers and rheostats for overheating and leakage (see component instruction books).

(14) Inspect the gaskets inside the cabinet and control covers to make sure they are waterproof.

(15) Check the loudspeaker for tears in the cone or a bent frame (fig. 47).

(16) Check for adequacy of moistureproofing and fungiproofing (pars. 51 and 52).

Section II. LUBRICATION AND WEATHERPROOFING

50. Lubrication

All lubrication points are supplied with a sufficient amount of grease or oil at the factory to last for the life of the equipment. Under normal conditions no other lubrication is necessary.

51. Weatherproofing

a. General. Signal Corps equipment, when operated under severe climatic conditions such as prevail in tropical, arctic, and desert regions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

b. Tropical Maintenance. A special moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection. This treatment is explained in TB SIG 13 and TB SIG 72.

c. Winter Maintenance. Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures are explained in TB SIG 66 and TB SIG 219.

d. Desert Maintenance. Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75.

52. Rustproofing and Painting

a. When the finish on the cabinet has been badly scarred or damaged, rust and corrosion can be prevented by touching up bare surfaces. Use #00 or #000 sandpaper to clean the surface down to the bare metal; obtain a bright smooth finish.

Caution: Do not use steel wool. Minute particles frequently enter the equipment cabinet and cause harmful internal shorting or grounding of circuits.

b. When a touch-up job is necessary, apply paint with a small brush. Remove rust from the cabinet by cleaning corroded metal with solvent (SD). In severe cases, it may be necessary to use solvent (SD) to soften the rust and to use sandpaper to complete the preparation for painting. Paint used will be authorized and consistent with existing regulations. Refer to TM 9–2851.

Section III. TROUBLE SHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

53. Scope

a. The trouble shooting and repair work that can be performed at the organizational maintenance level (operators and repairmen) is necessarily limited in scope by the tools, test equipment, replaceable parts issued, and by the existing situation. Accordingly, trouble shooting is based on the performance of the equipment and the use of the senses in determining such trouble as burned-out tubes, fuses, etc.

b. The following paragraphs in this section will help to determine which component is at fault. After localizing the fault to a component, the defective stage or item can be determined by following the instructions given in the particular component manual.

54. Visual Inspection

a. Failure of this equipment to operate properly usually will be caused by one or more of the following faults.

(1) Improperly connected battery cable.

(2) Worn, broken, or improperly connected cords or plugs.

(3) Burned-out fuse.

(4) Relay contacts burned because of overloads.

(5) Wires broken because of excessive vibration.

(6) Defective tube.

(7) Inactive (dirty or cracked) crystal.

b. When failure is encountered and the cause is not immediately apparent, check as many of the above items as is practicable before starting a detailed examination of the component parts of the system. If possible, obtain information from the operator of the equipment regarding performance at the time trouble occurred.

c. Visually inspect the antenna system for obvious abnormalities.

55. System Sectionalization of Trouble to a Component

System sectionalization consists of determining whether the trouble is in the receiver, the cabinet, the transmitter, the control, or the power supplies.

a. Operate the entire set and observe its performance. See the equipment performance checklist (par. 57) for normal operating indications.

b. If the entire radio set is inoperative, and the POWER indicator on the radio set control does not light, the trouble is probably in the primary power source which extends through fuse F801 and wiring in the cabinet, through a fuse and wiring in the transmitter power supply, through the power switch in the radio set control, and back to the transmitter power supply (figs. 50, 51, and 52).

c. If only one component is inoperative, first check for a burned-out fuse. Check fuses at an early stage in trouble shooting. Do not continue to burn out fuses before checking further to determine the source of the trouble.

d. If the signal is present in one component but there is no indication of the signal in the component which electrically follows or is associated with it, the trouble may be a defective or disconnected cord or connector.

e. To find the source of excessive noise in the receiver, remove the antenna cord. If noise becomes less pronounced or stops, the trouble is caused by some device external to the receiver. If noise persists after the antenna is disconnected, the trouble is in the receiver or in one of the components associated with it.

f. By the use of procedures similar to the simple checks given above, the trouble can be isolated to a particular unit.

g. If these checks are not productive, use the equipment performance checklist (par. 57).

56. Trouble Shooting by Using Equipment Performance Checklist

a. General. The equipment performance checklist (par. 57) will help the operator to locate trouble in the equipment. The chart gives the item to be checked, the conditions under which the item is checked, the normal indications and tolerances of correct operation, and the corrective measures the operator can take. *When using this chart, follow the items in numerical sequence.*

b. Action or Condition. For some items, the information given in the *Action or condition* column consists of various switch and control settings under which the item is to be checked. For other items, it represents an action that must be taken to check the normal indication given in the *Normal indications* column.

c. Normal Indications. The normal indications listed include visible and audible signs the operator should perceive when he checks the items. If the indications are not normal, the operator should apply the recommended corrective measures.

d. Corrective Measures. The corrective measures listed are those the operator can make without turning in the equipment for repairs. A reference in the checklists to a paragraph or technical manual indicates that the trouble probably cannot be corrected during operation and that trouble shooting by an experienced repairman is necessary.

Note. Refer to figures 29 through 34 for the locations of tubes, vibrators, and check points.

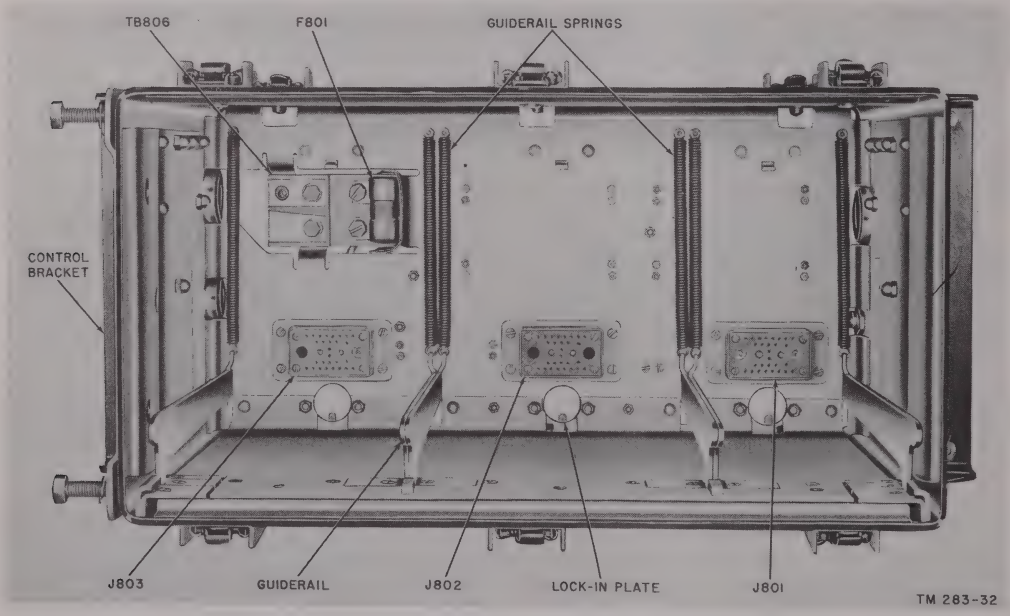


Figure 29. Electrical Equipment Cabinet CY–938/VRC, interior view.

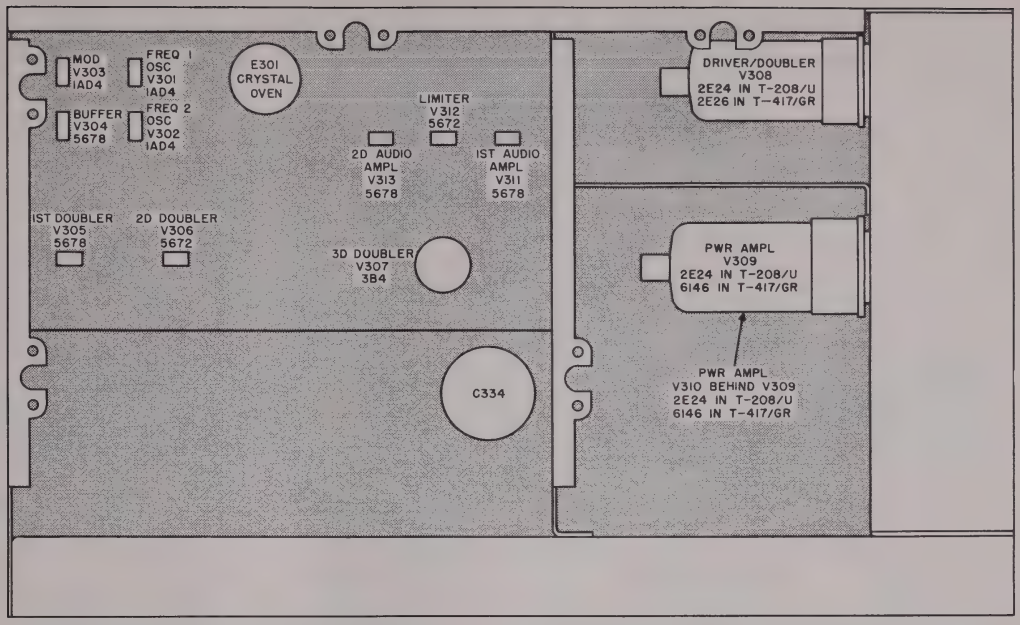

MOD V303 1AD4
FREQ 1 OSC V301 1AD4
BUFFER V304 5678
FREQ 2 OSC V302 1AD4
E301 CRYSTAL OVEN
LIMITER V312 5672
2D AUDIO AMPL V313 5678
1ST AUDIO AMPL V311 5678
1ST DOUBLER V305 5678
2D DOUBLER V306 5672
3D DOUBLER V307 3B4
C334
DRIVER/DOUBLER V308 2E24 IN T-208/U 2E26 IN T-417/GR
PWR AMPL V309 2E24 IN T-208/U 6146 IN T-417/GR
PWR AMPL V310 BEHIND V309 2E24 IN T-208/U 6146 IN T-417/GR
TM 283-33

Figure 30. Radio Transmitter T–208/U, tube location.

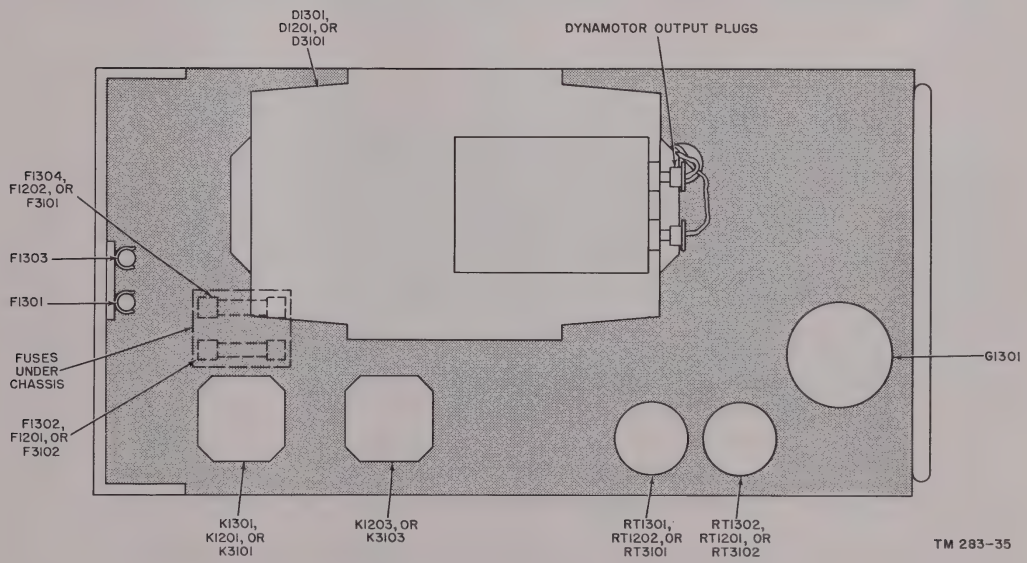


Figure 31. Transmitter Power Supply fuse and vibrator location.

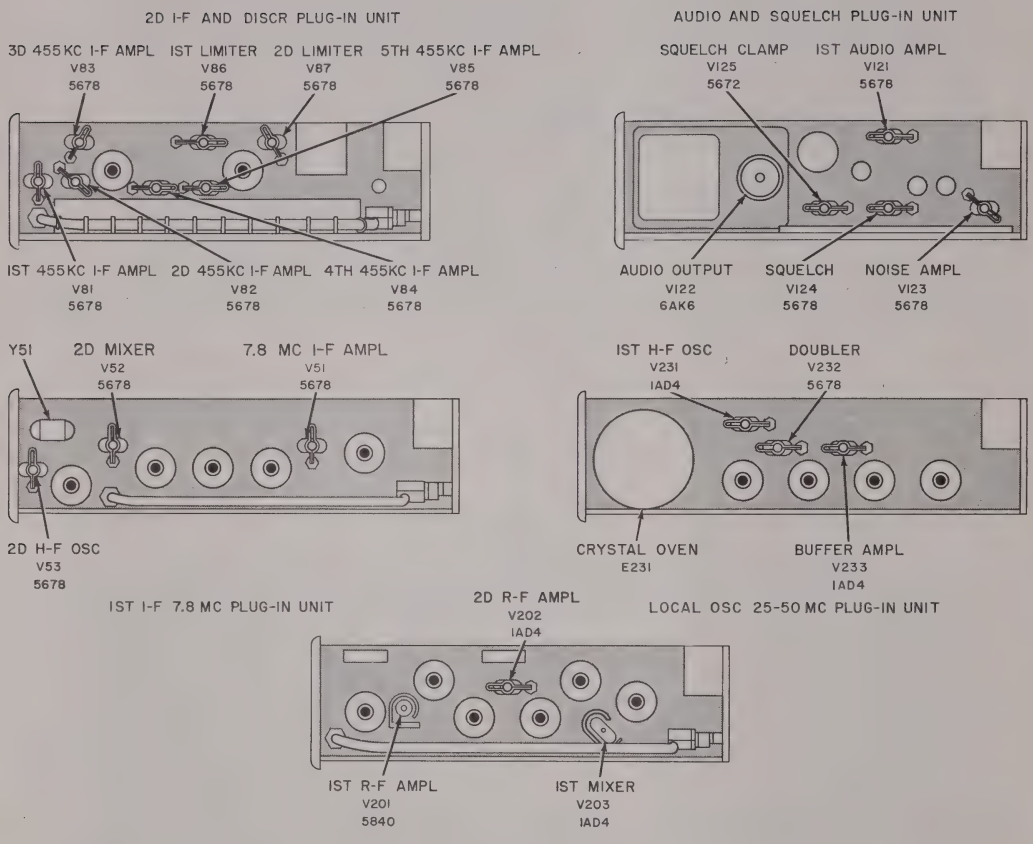

2D I-F AND DISCR PLUG-IN UNIT
3D 455KC I-F AMPL V83 5678
IST LIMITER V86 5678
2D LIMITER V87 5678
5TH 455KC I-F AMPL V85 5678
IST 455KC I-F AMPL V81 5678
2D 455KC I-F AMPL V82 5678
4TH 455KC I-F AMPL V84 5678
AUDIO AND SQUELCH PLUG-IN UNIT
SQUELCH CLAMP V125 5672
IST AUDIO AMPL V121 5678
AUDIO OUTPUT V122 6AK6
SQUELCH V124 5678
NOISE AMPL V123 5678
Y51
2D MIXER V52 5678
7.8 MC I-F AMPL V51 5678
2D H-F OSC V53 5678
IST I-F 7.8 MC PLUG-IN UNIT
IST H-F OSC V231 1AD4
DOUBLER V232 5678
CRYSTAL OVEN E231
BUFFER AMPL V233 1AD4
LOCAL OSC 25-50 MC PLUG-IN UNIT
2D R-F AMPL V202 1AD4
IST R-F AMPL V201 5840
IST MIXER V203 1AD4
R-F AMPL 25-50 MC PLUG-IN UNIT
TM 283-34

Figure 32. Radio Receiver R–257/U, tube location.

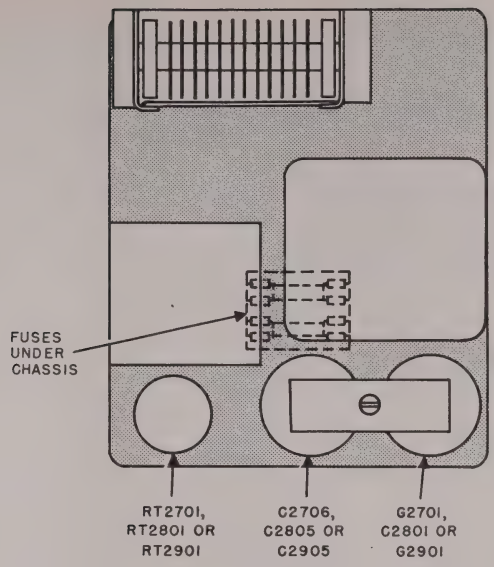


Figure 33. Receiver power supply fuse and vibrator location.

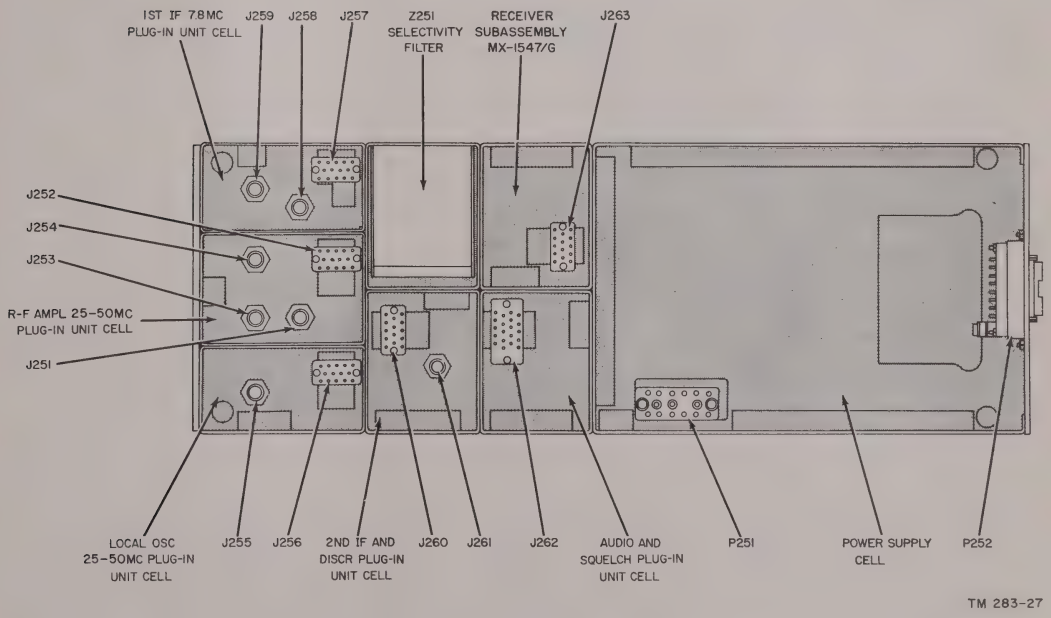


Figure 34. Radio Receiver R-257/U, compartment location.

57. Equipment Performance Checklist

	Item No.	Unit	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Radio Transmitter T–208/U.	TEST-OFF switch.	Set to OFF.		
	2		TUNE-OPERATE switch.	Set to OPERATE.		
	3	Electrical Equipment Cabinet CY–938/VRC.	Battery cable.	Connected between TB806 and battery.		
	4		Antenna cable.	Connected between antenna connector J804 on the cabinet and the antenna base connector.		
	5		Control cable (20-wire).	Connected between TB804 and TB805.		
	6	Radio Set Control C–847/U.	Control cable (20-wire).	Connected between TB1501 and TB1502.		
	7		Handset cable.	Connected to HANDSET jack.		
	8		VOLUME-OFF switch.	Rotate to OFF.		
	9		FREQ 1-2 switch.	Set to 1 or 2, depending on frequency desired.		
	10		SQUELCH ON-OFF control.	Rotate to OFF.		
START	11	Radio Set Control C–847/U.	VOLUME-OFF switch.	Set to a position other than OFF.	POWER indicator lights.	Check fuse F801. Check battery cable connection for poor contacts. Check cable to control unit for defect or poor connection. Check connections in cabinet. Check for a defective power switch in the control. Check for a defective POWER indicator lamp.

57. Equipment Performance Checklist—(contd)

	Item No.	Unit	Item	Action or condition	Normal indications	Corrective measures
						Check for a defective fuse in the receiver power supply.
					A signal or noise is heard in the speaker or handset.	Check for a defective fuse in the receiver power supply.
						Check terminals 11 and 12 of terminal boards TB1502 and TB805 in the radio set control and cabinet, respectively.
						Check receiver connection to cabinet.
						Refer to the receiver instruction book.
EQUIPMENT PERFORMANCE	12	Radio Set Control C–847/U.	SQUELCH-OFF control.	Turn counterclockwise.	Without a signal, noise can be heard as the control is turned counterclockwise until a certain point is reached, then the speaker and handset are quieted.	Check for a defective audio and squelch plug-in unit in the receiver.
						Check for a defective SQUELCH control or disable switch.
						Check for improper or poor connections in cabinet.
						Refer to receiver instruction book.
					An incoming signal on the receiver frequency will operate the speaker and handset.	Check the antenna.
						Refer to receiver instruction book.
	13	Handset.	Push-to-talk switch.	Depress switch.	TRANSMIT indicator lights.	Check for a poor handset connection or switch.
						Check for defective transmitter power supply.
						Check for an incorrect connection in the cabinet or in the radio set control.
					The receiver is disabled.	Check the SQUELCH control. If in the OFF position turn it counterclockwise.
						Check jumper connections between terminals 3 and 4 of terminal board TB801 in the cabinet.
						Refer to receiver and transmitter instruction books.
					The transmitter power supply dynamotor can be heard.	Defective fuse in transmitter power supply.

57. Equipment Performance Checklist—cont'd

Item No.	Unit	Item	Action/ condition	Normal indication	Corrective measure
					Refer to transmitter power supply instruction book.
			Release switch.	a signal or note a board in the speaker or speaker	Same as for second normal indication in Item No. 16.
	16	Radio Set Control C-847 IT.	ITALIAN switch.	Change in the other transmitter.	The transmitted signal will be at a different frequency (check against appropriate receiving station).	Check for a defective wrong crystal in the transmitter.
						Check for a defective oscillator tube in the transmitter.
						Check for continuity of the oscillator filament circuit.
						Refer to the transmitter instruction book.
	18		SPEECH (HI-LOW) switch.	Turn a LOW position.	Speaker will be inoperative, headset will operate.	Check for defective speaker switch or switch wiring.
	19	Receiver R-48, PT	Push-to-talk switch.	Release switch.	Transceiver is disabled.	Check for defective switch.
					The HEADSET also does not.	Check for defective wiring or connections in cabinet.
						Check for a stuck relay in the transmitter power supply. Refer to the power supply instruction book.
8 7 . 9	17	Radio Set Control C-847 IT.	VOLTAGE-OFF switch.	Turn counterclockwise to the OFF position.	PLATE indicator goes out.	Check for incorrect cabinet wiring, a defective switch or relay. Refer to component instruction books.
					Receiver is inoperative.	Same as above.
					Transceiver is inoperative.	Same as above.

CHAPTER 4

THEORY

58. Scope

a. System theory is presented to provide an understanding of how the several units contained in the radio set function together to provide a complete system (par. 59). An understanding of the functioning of the complete system will aid in isolating trouble to a particular unit.

b. To familiarize personnel with the circuits contained in the transmitter, receiver, and power supplies, block diagrams of these units are discussed briefly in paragraphs 60 through 66. Detailed theory for these units is covered in separate publications. (See detailed theory for Radio Set Control C-847/U and Electrical Equipment Interset CY-409/TRC in unit covered in separate publications, it is discussed in this chapter pars. 66 and 67.

59. System Theory (fig. 2)

a. The circuits of Radio Set AN/TRC-47 are built around Radio Transmitter T-208/U and Radio Receiver R-287/U. These components are plug-in units and require the use of Electrical Equipment Interset CY-409/TRC which serves as a connector for the components. It also has facilities for interconnecting the components. Since the system must be capable of operating from a 28-, 12-, or 6-volt source for Radio Sets AN/TRC-47, -47A, and -47B respectively, individual plug-in power supplies are used for both the receiver and transmitter. The receiver power supply is contained within the receiver; the transmitter power supply is mounted externally to the transmitter. When the system is changed from one voltage to another, the proper power supplies for the receiver and for the transmitter (fig. 2) must be inserted.

b. The receiver and the transmitter operate from the same antenna which is switched between the receiver and transmitter by a coaxial type relay. For simplicity of operation the radio set was designed to have a minimum number of operator manipulated controls; these controls are located on Radio Set Control C-847/U.

60. Block Diagram of Radio Transmitter T-208/U

The block diagram of Radio Transmitter T-208/U is shown in figure 28. For more detailed over-all circuit information, refer to the radio schematic (fig. 42) and to the instruction book covering Radio Transmitter T-208/U. The signal paths through the transmitter are described below.

a. *Frequency and Frequency Oscillators.* Two crystal-controlled oscillator stages, V301 and V302, are used to allow quick changing between two preset operating frequencies. The oscillator to be used is selected by the PRESET C-2 switch on Radio Set Control C-847/U which supplies filament voltage to one stage and removes it from the other. A frequency of 1.3625 to 1.375 mc, depending on the crystal used, is developed in the oscillator and fed to phase modulator V303.

b. *Phase Modulator.* An audio signal from tube V201 also is applied to phase modulator tube V303. The combination of audio and r-f signals applied to the modulator produces an f-m signal in its output circuit which varies 907.2 cycles on each side of the oscillator setting to radio actual frequency for 100 percent modulation. The output of the modulator is applied to buffer V304.

c. *Buffer Doubler.* The buffer doubler, V304, provides isolation between the modulator and first doubler. It has a single tuned plate circuit tuned to the crystal frequency; its output is applied to first doubler V305.

d. *First, Second, and Third Doublers, and Doubler Driver.* These stages are frequency multipliers and, with the exception of the third doubler,

have single tuned plate circuits. The third doubler has a double tuned plate circuit. The plate circuits operate at 2, 4, 8, and 16 times the crystal frequency respectively, and produce deviations of 1,875, 3,750, 7,500, and 15,000 cycles respectively. The plate circuit of the doubler driver is capacitively coupled to the grid circuits of power amplifiers V309 and V310.

e. Power Amplifier. The power amplifier consists of two type 2E24 tubes, V309 and V310, operated in parallel. The plate tank has two tuning adjustments, a capacitor which is preset for the operating frequency and a replaceable coil which provides the proper inductance for the operating band. The antenna coupling is adjusted by variable coupling switch S303. Power output from the final amplifier is applied through the antenna filter which is used to reduce harmonic emission.

f. First Audio Amplifier. Audio signals from the microphone of Handset H–33/PT or from the receiver (during retransmission) are applied through an impedance-matching transformer and a high-pass filter to the control grid of the first audio amplifier, V311 (5678). The output of this stage is coupled to the control grid of the limiter tube.

g. Limiter. Limiter tube V312 is a type 5672 tube and serves to limit the magnitude of strong audio signals in order to keep the transmitter deviation below its maximum limit. The output of the limiter is applied to the second audio amplifier through a waveshaping network.

h. Second Audio Amplifier. The audio signal from the limiter stage is further amplified by the second audio amplifier ,V313, a subminiature type 5678 tube. Audio output from this tube is applied to the control grid of the phase modulator tube to produce a phase modulated signal as discussed in subparagraph *b* above.

61. Block Diagram of Radio Receiver R-257/U

a. General. The signal paths through the receiver are shown in the block diagram (fig. 36) and a complete schematic diagram is shown in figure 61. For a more detailed explanation of the receiver circuits, refer to the instruction book covering Radio Receiver R–257/U.

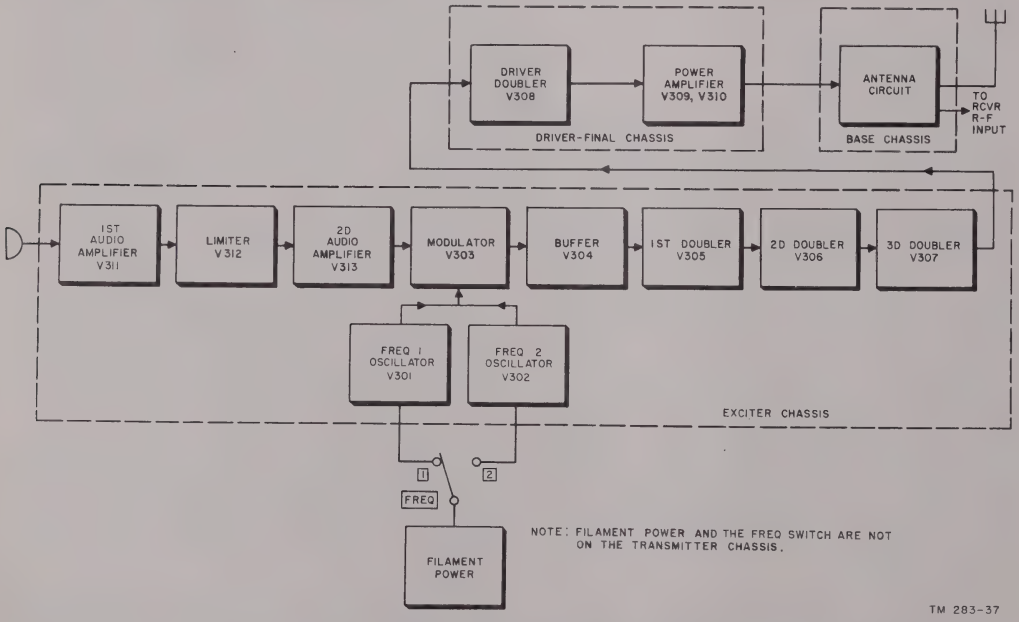


Figure 35. Radio Transmitter T–208/U, block diagram.

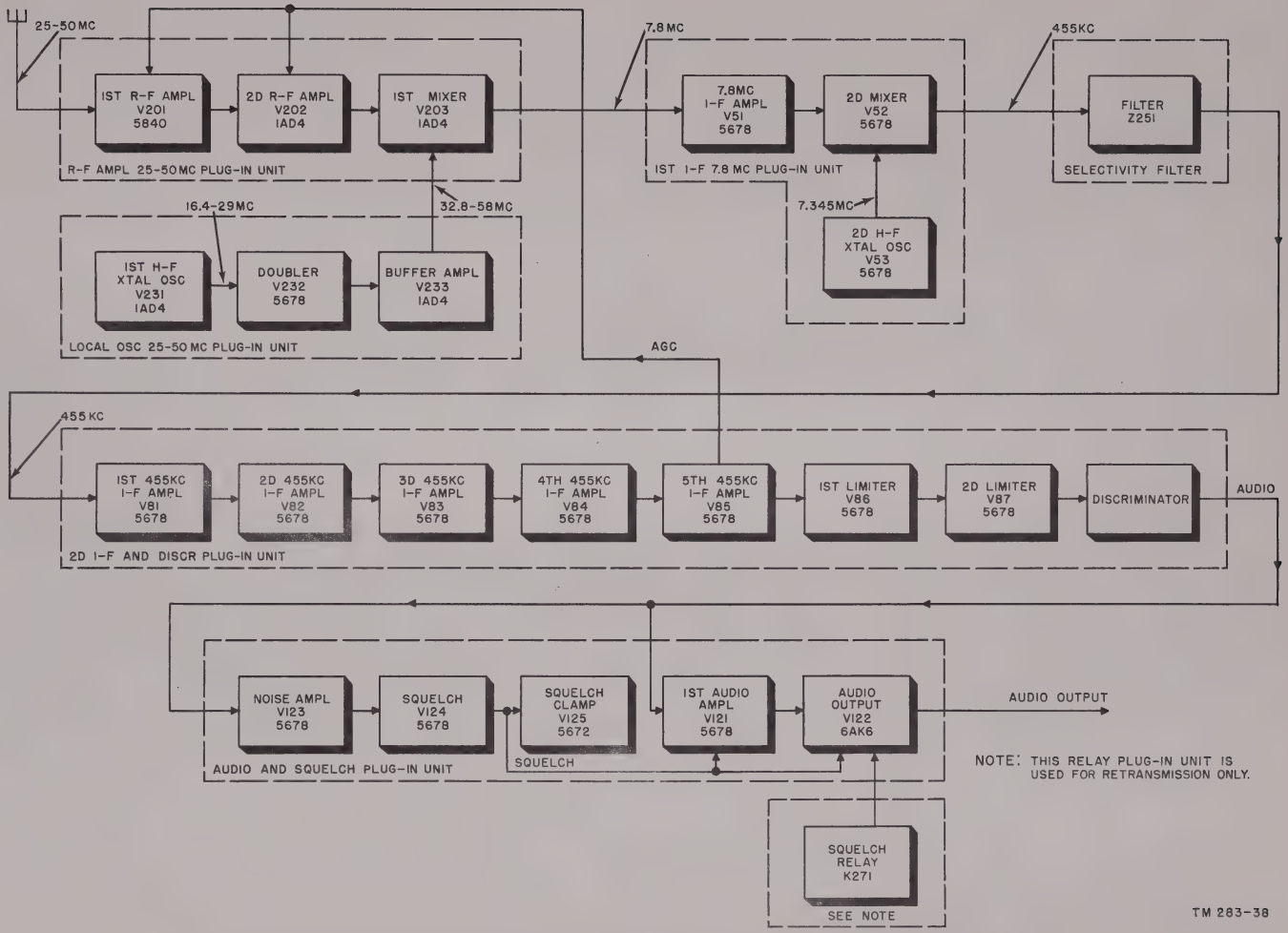


Figure 36. Radio Receiver R-257/U, block diagram.

b. R-F AMPL 25-50 MC Plug-in Unit. An f-m signal from the antenna is fed to first r-f amplifier V201 where it is amplified, and then amplified still further by the action of second r-f amplifier V202. The two r-f amplifiers also improve the signal plus noise-to-noise ratio and the image rejection ratio of the receiver. Gain of the r-f amplifiers is controlled by a delayed agc (automatic gain control) voltage developed in the grid circuit of fifth 455-kc i-f amplifier V85. The amplified signal is coupled into first mixer V203 where it is heterodyned with a signal from the LOCAL OSC 25-50 MC plug-unit (V231, V232, V233), the output of which is 7.8 mc higher in frequency than the incoming r-f signal. Sum and difference beat frequencies result, but only the difference frequency is accepted by the following stage, 7.8 mc i-f amplifier V51.

c. FIRST I-F 7.8–MC Plug-in Unit. The 7.8-mc i-f signal is amplified in 7.8 mc i-f amplifier V51 and coupled to second mixer V52 where it is heterodyned with a 7.345-mc signal from second high frequency crystal oscillator V53. As a result of the heterodyning, a second i-f of 455 kc is developed. This i-f signal is applied to first 455-kc i-f amplifier V81 through a selectivity filter (Z251). The filter functions to limit the bandwidth of the i-f signal to 15 kc above and below 455 kc.

d. SECOND I-F AND DISCRIMINATOR Plug-in Unit. The i-f signal is amplified by five 455-kc i-f amplifiers, V81 thru V85. A portion of the negative d-c voltage developed at the grid of fifth 455-kc i-f amplifier V85 is used as a delayed agc voltage to control the gain of first and second r-f amplifiers V201 and V202. The output of V85 passes through two limiters, V86 and V87, which perform the function of maintaining a constant amplitude voltage input to the discriminator, even though the signal from the antenna may fluctuate. They also eliminate noise which may be superimposed on the signal. Discriminator rectifiers, CR81 and CR82, change the f-m i-f signal into an audio voltage, which is applied to first audio amplifier V121 for amplification.

e. LOCAL OSC 25-50 MC Plug-in Unit. The local oscillator plug-in unit contains first high frequency oscillator V231 which produces signals between the frequency limits of 16.4 mc and 28.9 mc. A doubler stage (V232) multiplies this frequency by a factor of two, producing a signal within a frequency range of 32.8 mc to 57.8 mc. The operating frequency of the oscillator (V231) is stabilized by housing its crystal in a plug-in type, temperature controlled oven (E231). The signal from the doubler is applied through buffer amplifier V233 to the first mixer, V203, in the r-f amplifier plug-in unit, as explained in subparagraph *b*. The buffer amplifier amplifies the signal, and provides isolation between the doubler and first mixer.

f. AUDIO AND SQUELCH Plug-in Unit. Audio signals from the discriminator (subpar. *d* above) are amplified by first audio amplifier V121 and audio output (power amplifier) V122 to a level that is sufficiently high to drive Handset H–33/PT and the loudspeaker in Radio Set Control C–847/U. Noise signals from the discriminator also are fed to noise amplifier V123 where they are amplified and coupled to squelch tube V124. The squelch tube makes first audio amplifier V121 and audio output tube V122 inoperative when no signal is being received; thus excessive noise will not be heard in the earphone or speaker during periods of no signal reception. Squelch clamp tube V125 acts to prevent the control voltage from the squelch tube (V124) from going positive when a signal is being received. A combination SQUELCH control and disabling switch is provided on Radio Set Control C–847/U. Squelch relay, K271, turns the transmitter on when a signal is being received during retransmission operation (par. 26*e*). The relay is used for retransmission only, and normally is not supplied with the equipment.

62. Block Diagram of Dynamotor-Power Supply DY-100/U

a. The power and control circuits in Dynamotor-Power Supply DY–100/U are shown in the block diagram, figure 37, and are discussed in subparagraph *b* below. For a more detailed explanation refer to the instruction book covering Dynamotor-Power Supply DY–100/U. This dynamotor supplies power to the transmitter when a 6-volt storage battery is used as the primary power source.

b. A single multipin connector, P1203, connects the power supply to Electrical Equipment Cabinet CY–938/VRC. Since the battery supply is 6 volts, it can be used in the 6-volt circuits without the use of vibrators and transformers. The input current which is needed to operate the power supply is controlled by power-on relay K1203. This relay is energized by the VOLUME-OFF

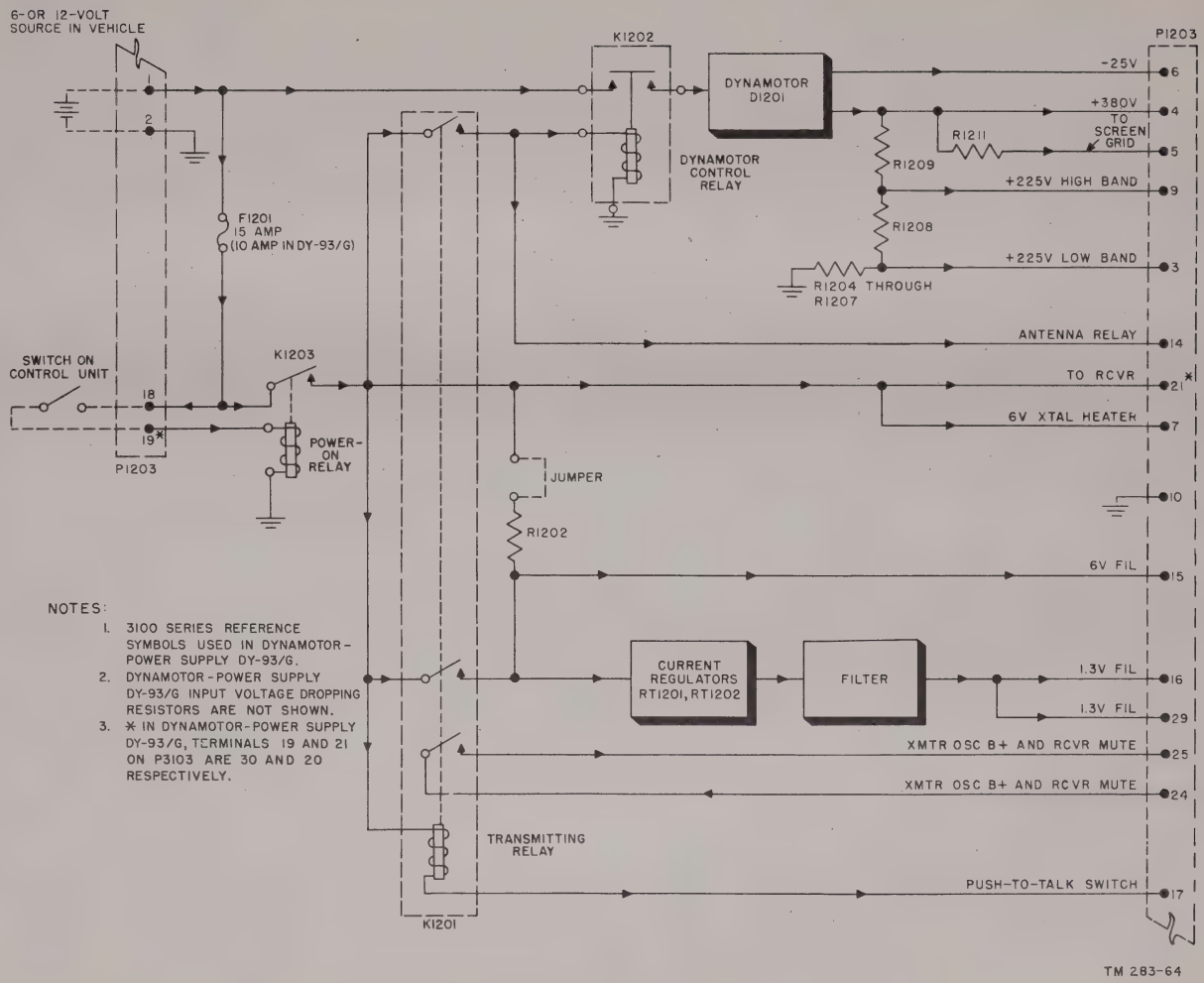


Figure 37. Dynamotor-Power Supplies DY–93/G and DY–100/U, functional block diagram.

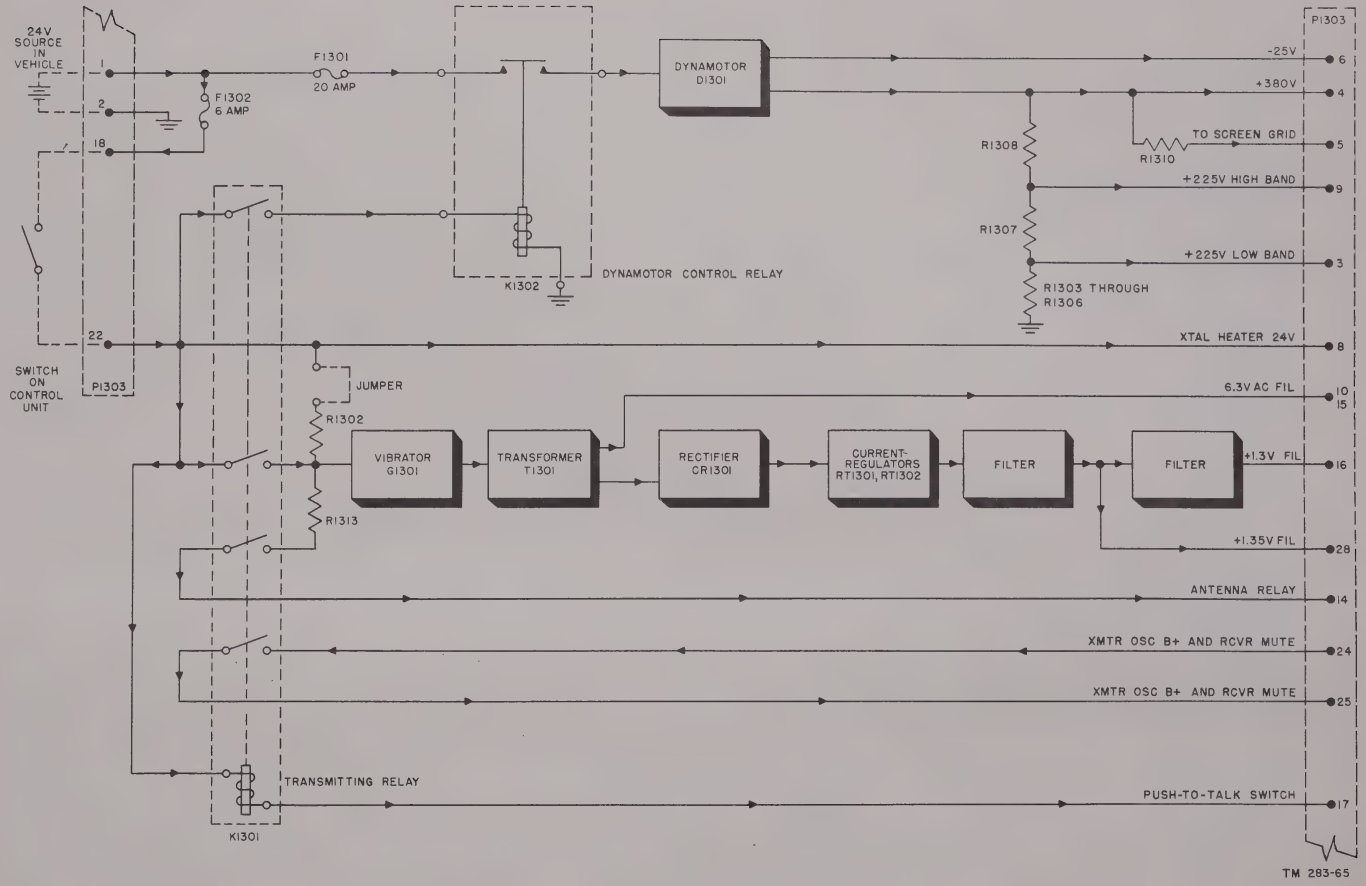


Figure 38. Dynamotor-Power Supply DY–98/G, functional block diagram.

switch on the radio set control, and distributes the battery voltage to the receiver power supply, to the coil and contacts of relay K1201, and to the internal circuits of the transmitter power supply. When relay K1201 is actuated (push-to-talk switch on Handset H–33/PT depressed), it supplies voltage to the filament and dynamotor circuits. In addition to controlling the above voltages, power supply relay K1201 also actuates the antenna change-over relay in the transmitter and closes a receiver mute circuit. The input current for the dynamotor is controlled by contactor K1202, which is energized through contacts of relay K1201. Dynamotor D1201 supplies B+ voltages of 380 volts and 225 volts, and a bias voltage of −25 volts to the transmitter. Voltage regulation is provided in the 1.3-volt filament circuit by two current regulating tubes, RT1201 and RT1202. The output of the filament circuit is applied through two paths to the transmitter.

63. Block Diagram of Dynamotor-Power Supply DY-93/G

The circuits of Dynamotor-Power Supply DY–93/G are very similar to those in Dynamotor-Power Supply DY–100/U (fig. 37). The main difference between the power supplies is that several additional voltage-dropping resistors are required in Dynamotor DY–93/G to reduce the 12-volt input voltage to 6 volts. Refer to the DY–93/G schematic, figure 56, for this difference,

64. Block Diagram of Dynamotor-Power Supply DY-98/G

a. The power and control circuits in Dynamotor-Power Supply DY–98/G are shown in the block diagram (fig. 38) and are discussed in subparagraph *b* below. The main schematic diagram is shown in figure 57.

. *b.* The high-voltage section of Dynamotor DY–98/G is similar to the high-voltage section in the 6- and 12-volt power supplies; however, the manner in which the filament voltage is derived is quite different. In this power supply, the 24-volt input is changed to a-c by vibrator G1301 and applied to transformer T1301. The 6-volt tube filaments of the transmitter are provided with a-c voltage from the secondary of the transformer. A portion of the secondary voltage is rectified by full-wave selenium rectifier CR1301 and applied to the 1.3-volt filament circuit through current regulators RT1301 and RT1302 and two filter sections. Note that the power-on relay (K1203), shown in the 6- and 12-volt block

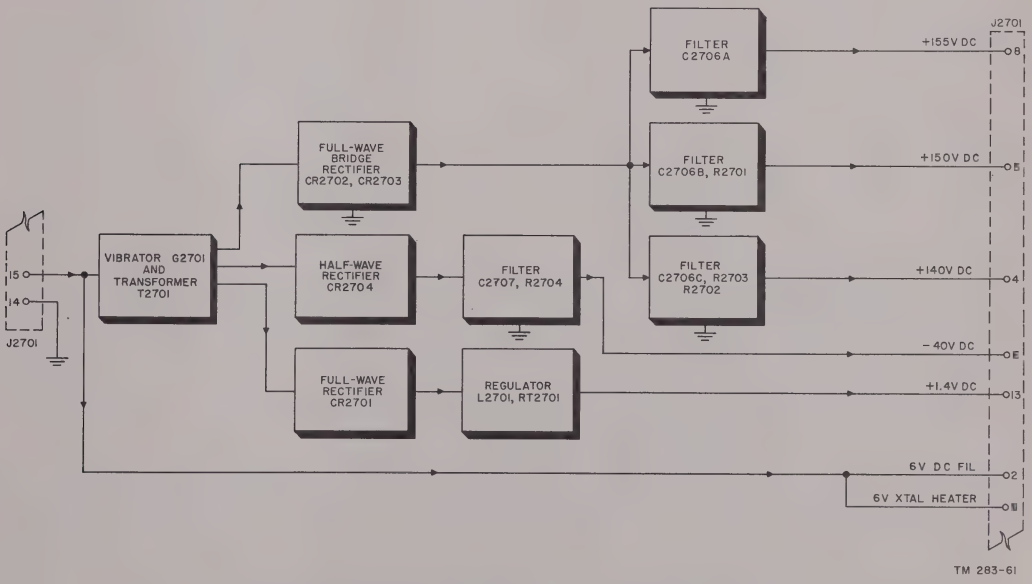


Figure 39. Power Supply PP–869/U, functional block diagram.

diagram (fig. 37), is not used in the 24-volt model. Because of the lower input current in the 24-volt model, the VOLUME-OFF switch on the radio set control is used to control relay K1301 directly instead of through a power-on relay.

65. Block Diagrams of Power Supplies PP-867/U, PP-868/U, and PP-869/U

a. The circuits in Power Supplies PP–867/U, PP–868/U, and PP–869/U are shown in the block diagrams, figures 39, 40 and 41, and are discussed in subparagraph *b* below. The main schematic diagrams are shown in figures 58, 59 and 60. For a more detailed explanation refer to the instruction book covering Power Supplies PP–867/U, PP–868/U, and PP–869/U.

b. The circuits of the power supplies are very similar with minor exceptions. Power Supply PP–868/U (12-volt model) contains a vibrator and transformer to develop the three high voltages, the bias voltage, and the filament and crystal oven voltages required for the receiver. The 6-volt model, Power Supply PP–869/U, uses the same arrangement but has one less secondary winding on the power transformer. This winding can be eliminated because the primary source voltage of 6 volts is fed directly through the power supply to the receiver 6-volt tube filaments and to the 6-volt crystal oven. In the 12-volt version, Power Supply PP–868/U, a 6.3-volt winding on the transformer supplies the 6-volt heater and crystal oven potential. Power Supply PP–867/U also uses the additional 6.3-volt winding; however, it is used only for the filaments of the two 6.3-volt receiver tubes. The primary power source voltage of 24 volts passes through the power supply to operate the 24-volt receiver crystal oven. The above differences in circuits can be seen readily by comparing the schematic diagrams of the three power supplies.

66. Theory of Electrical Equipment Cabinet CY-938/VRC

A schematic diagram of Electrical Equipment Cabinet CY–938/VRC is shown in figure 49. As can be seen from the illustration, the cabinet consists of numerous connectors and cables of wires to make the interconnections between components. The connections between the terminal boards and jacks represent wiring which would ordinarily be in cables between the components. Radio Set AN/VRC–6(*) has been designed so that interconnections are contained mostly in the cabinet; these interconnections in conjunction with the jacks allow simplified and automatic

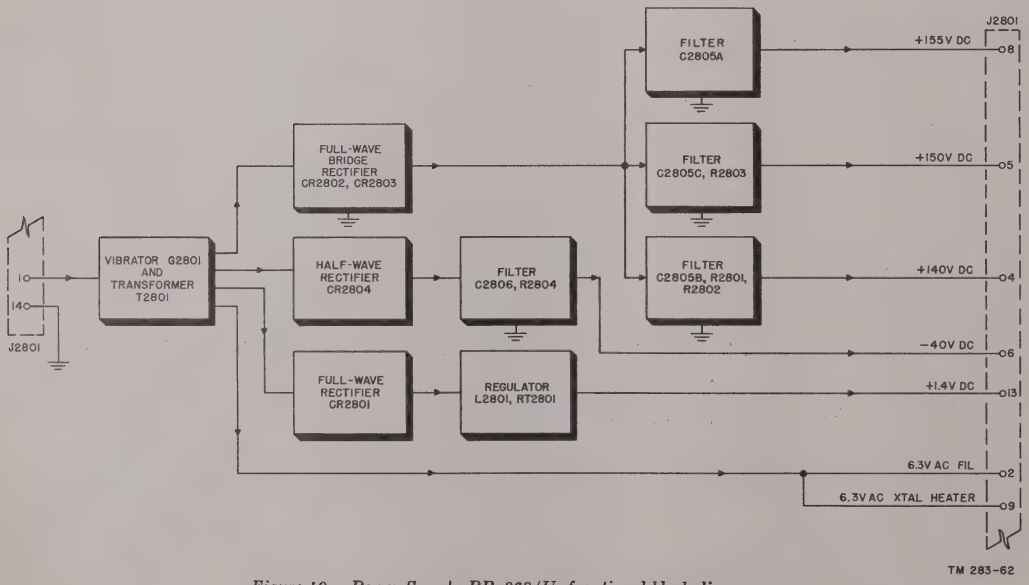


Figure 40. Power Supply PP–868/U, functional block diagram.

connections when the components are installed in the cabinet. The wiring is intricately related to all the components in the radio set and, therefore, cannot be explained separately. The information concerning the wiring is given throughout this chapter. Besides the internal wiring of the cabinet there are connections to three external circuits. One is the antenna circuit which connects through a coaxial cable to the side of the cabinet. The second circuit is used to bring the d-c power from the vehicle battery to the cabinet, and contains a fuse (F801) which has a capacity of 50 amperes and which protects the power source. The third circuit consists of a 20-wire cable which connects the cabinet to Radio Set Control C–847/U. The wires in the cable are connected to terminal boards TB804 and TB805 in the cabinet.

67. Theory of Radio Set Control C-847/U

a. General. Radio Set Control C–847/U controls the radio set after the presetting adjustments have been made. The circuits of the control are connected to Electrical Equipment Cabinet CY–938/VRC through a 20-wire cable where they are distributed to the other components. The circuits fall into three general categories: audio, control, and indication. Since most of the circuits in the radio set control depend on the operation of circuits in other components, they are not described in detail in this paragraph, but are combined with other circuits discussed elsewhere in this chapter. Refer to figure 42 for the schematic diagram of the control.

b. Circuits. The following circuits are contained in the control:

(1) *General.* Power switch S1501B controls the power to the radio set. It is coupled mechanically to the VOLUME switch S1501A so that only one knob is necessary for both power and VOLUME control. In the OFF position of this control, S1501B is open and prevents power from being applied to the radio set. At the same time the connection through S1501A is incomplete so that audio cannot get through to the speaker or handset. The connections to the switch for d-c power are through terminals 16 and 17 of TB1502. The connections for 115-volt a-c power (not normally used in Radio Set AN/VRC–6(*)) are through terminals 13 and 15 of TB1502. For more details on how to switch functions

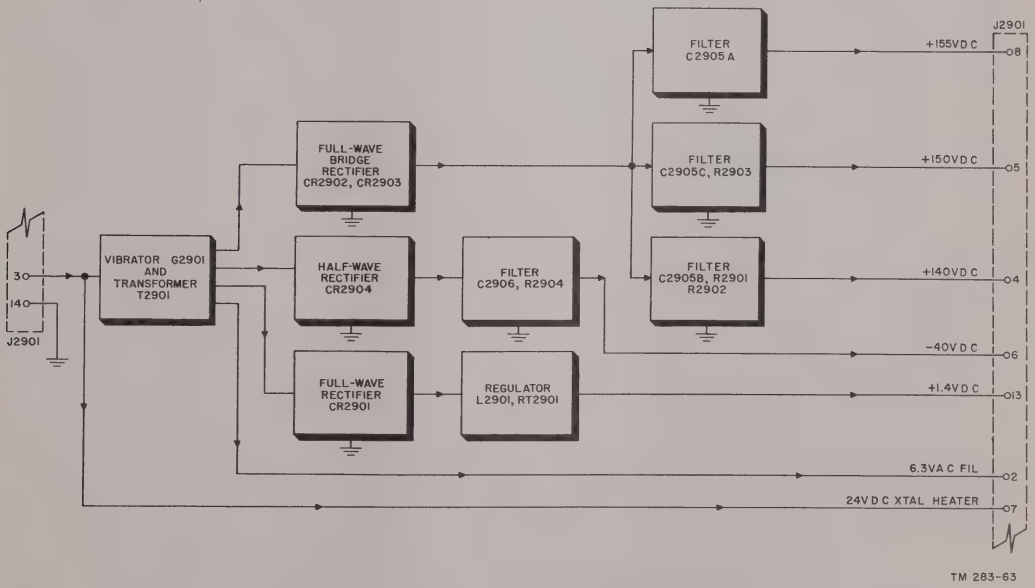


Figure 41. Power Supply PP–867/U, functional block diagram.

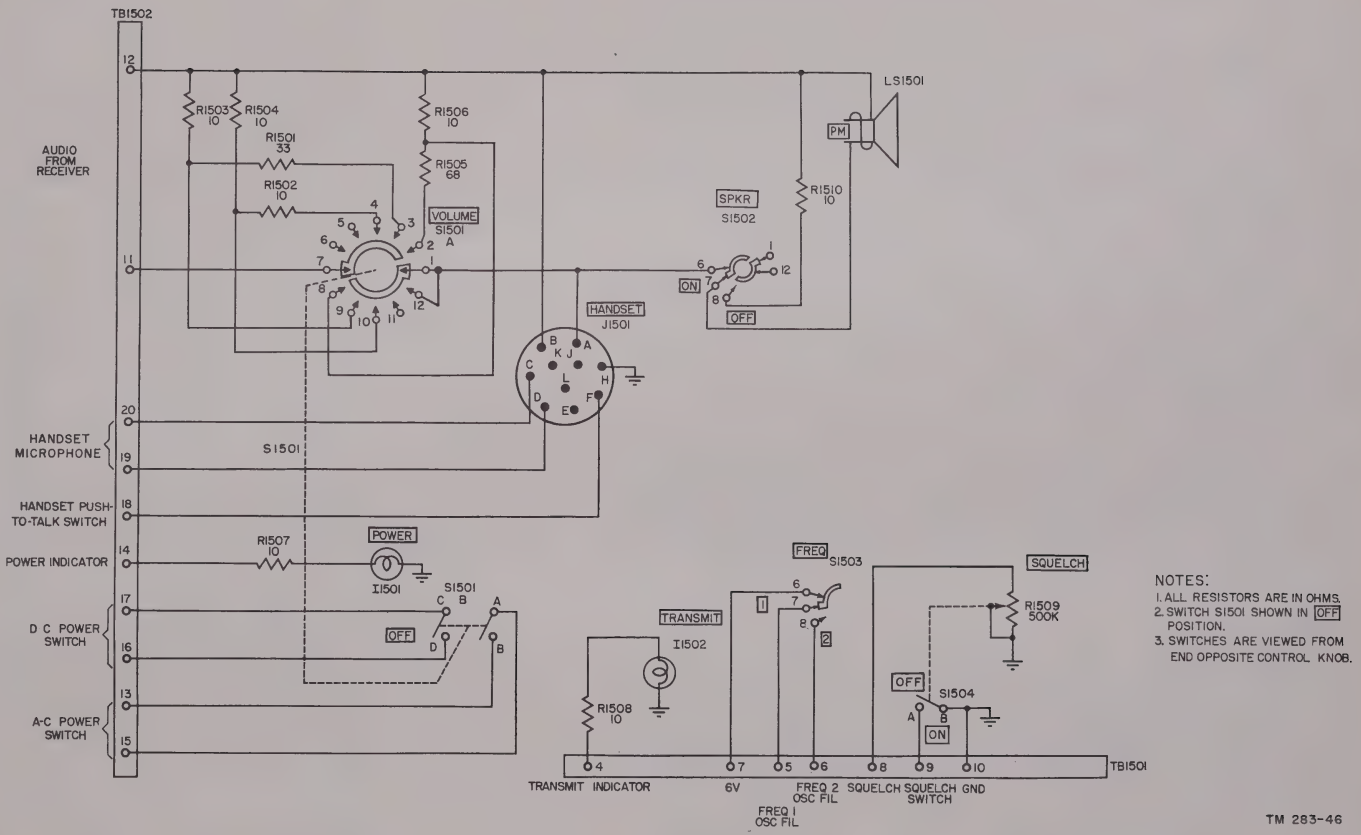


Figure 42. Radio Set Control C-847/U, schematic diagram.

in the over-all circuit refer to paragraphs 71, 72, and 73. Another of the power control switches is located in the handle of Handset H–33/PT. This is the push-to-talk switch which is connected to the radio set control through terminals 18 of TB1502 and 10 of TB1501. It is a low-voltage switch used to energize power controlling relays which switch the radio set from receive to transmit conditions.

(2) *Receiver audio.* Signals from the receiver (applied through terminals 11 and 12 of TB1502) pass through VOLUME switch S1501A and an attenuator pad to the handset receiver and/or speaker. This circuit changes the audio level when the position of the VOLUME switch is varied. SPKR switch S1502 removes speaker LS1501 from the circuit when it is not being used. Details of these circuits are covered fully in paragraph 68.

(3) *Transmitter audio.* The output of the handset microphone is taken from the control unit through terminals C and D of J1501 and terminals 19 and 20 of TB1502. Refer to paragraph 69 for more information concerning connections between the microphone and transmitter.

(4) *Control.* FREQ 1-2 switch S1503 is provided to allow the operator to switch between two preset transmitting frequencies. The switch connects filament voltage to the transmitter oscillator tube which is to be used for the desired frequency and removes it from the other oscillator tube. The 1.3-volt filament voltage is brought into the control at terminals 7 and 10 (ground) of TB1501. The switch then distributes it to one of the two terminals, 5 or 6, depending on the chosen frequency. When the switch is in the No. 1 position it is connected to terminal 5 and applies filament voltage to the frequency 1 oscillator filament. In the No. 2 position the 1.3 volts are applied through terminal 6 of TB1501 to heat the filament of the frequency 2 oscillator tube. SQUELCH control, R1509 and S1504, is a potentiometer and switch combination. SQUELCH switch, S1504, when closed, disables the squelch circuit by grounding its output circuit through terminal 9 of TB1501. SQUELCH potentiometer R1509 controls (through terminal 8 of TB1501) the level at which squelching action occurs. As the resistance of the SQUELCH potentiometer is decreased

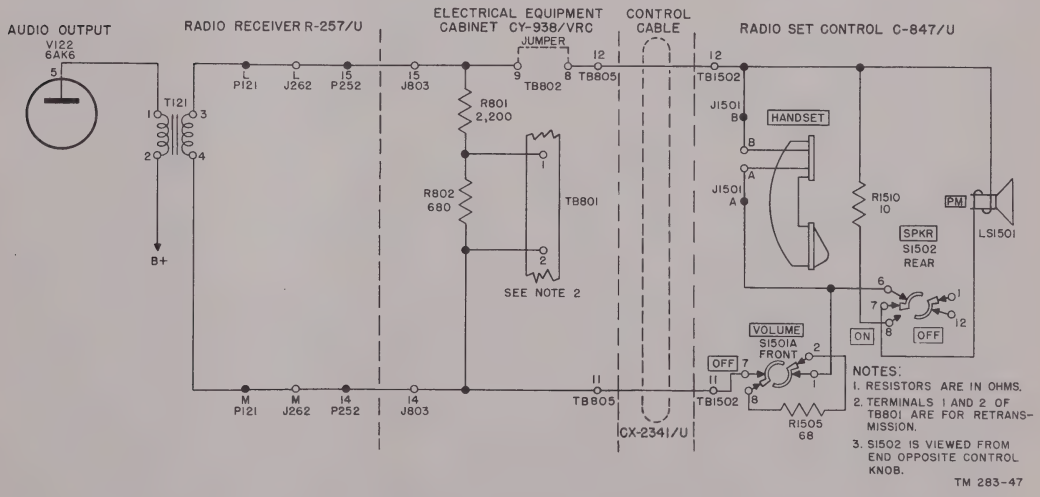


Figure 43. Audio output to handset and speaker, simplified.

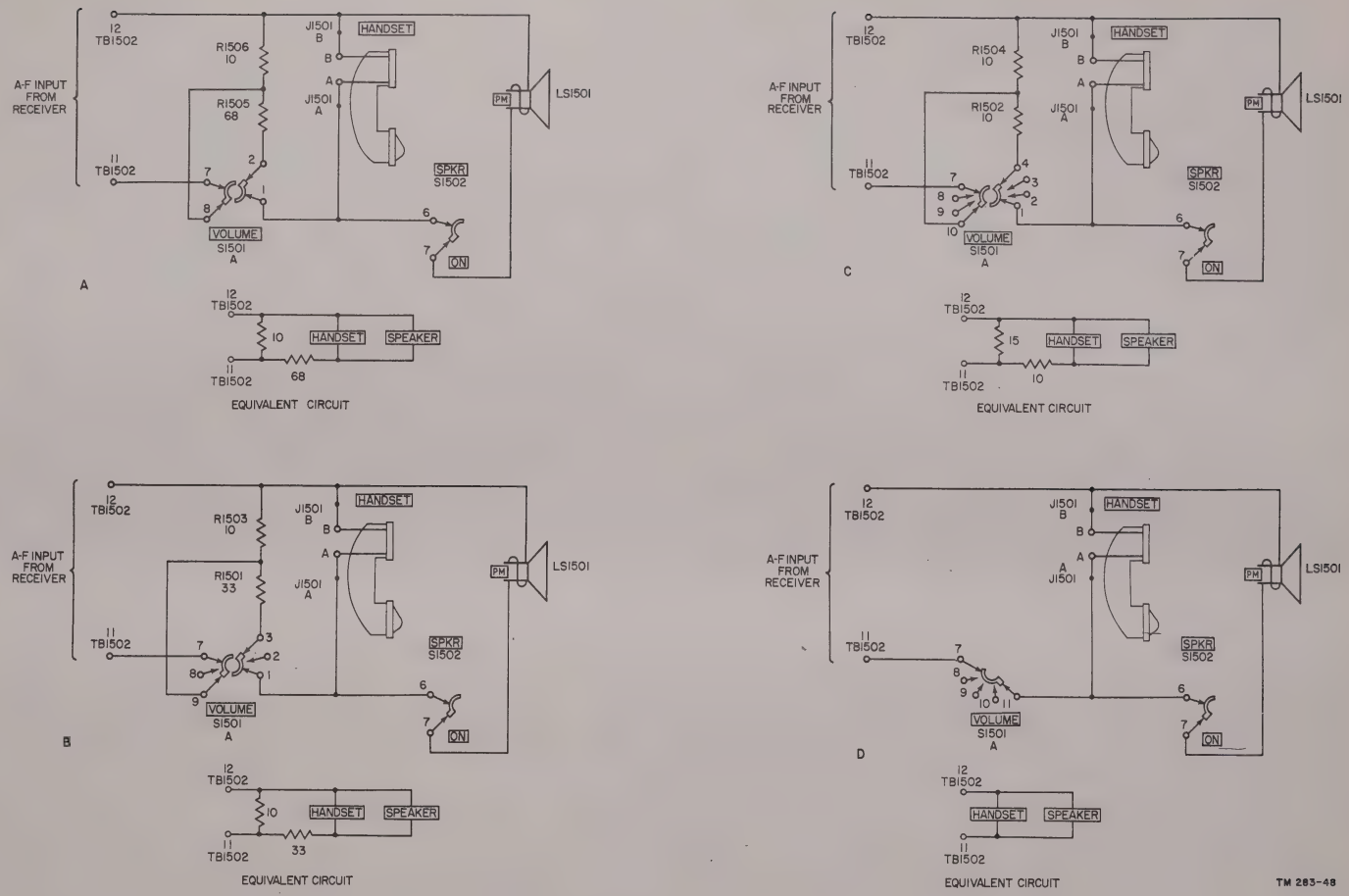


Figure 44. Radio Set Control C-847/U, volume control circuit, simplified.

(control turned counterclockwise), the SQUELCH circuit has less effect in quieting the receiver. A complete explanation of this circuit can be found by referring to the instruction book covering Radio Receiver R–257/U.

(5) *Indicators.* Two indicator lamps are incorporated in the control. POWER lamp I 1501 indicates when power is supplied to the radio set. Resistor R1507 is connected in series with the lamp to limit current through it. The lamp receives its power through terminal 14 of TB1502 and 10 of TB1501 (ground). TRANSMIT lamp I 1502 is illuminated when the transmitter is in operation. This lamp also has a current limiting resistor (R1508) in series with it. Power to the lamp is applied through terminals 4 and 10 (ground) of TB1501.

68. Audio Output of Receiver
(fig. 43)

a. General. The audio output of the receiver is developed across the secondary of transformer T121 (terminals 3 and 4). From the transformer, the signal takes a path through plug-in unit connectors P121 and J262, receiver main connector P252, and through Electrical Equipment Cabinet CY–938/VRC to Radio Set Control C–847/U. At the control it is applied to the handset receiver and/or speaker. SPKR ON-OFF switch S1502 is provided to disconnect the speaker so that only the handset receives the audio signal (if desired). The switch is spring-loaded and must be held in the OFF position. When the speaker is out of the circuit, it is replaced by 10-ohm resistor R1510, through contacts 6 and 8, in order to keep a constant load on the audio transformer. In Electrical Equipment Cabinet CY–938/VRC, series resistors R801 and R802 are connected across the audio line. These resistors form an attenuator and matching network and are used, during retransmission, to feed the audio signal to the speech amplifier in the transmitter. The retransmission circuit is described in more detail in paragraph 69. A jumper between terminals 8 and 9 of TB802 permits the audio to be disconnected from the speaker and handset, if desired, while retransmission is taking place. Resistor R1505 is used in the attenuator circuit and is discussed in subparagraph *b*.

b. Volume Attenuator Circuit (fig. 44). VOLUME switch S1501A has five positions, and controls the audio level to the handset and/or speaker from zero to full output of the receiver. Zero level is obtained in the OFF position which completely disconnects the audio. In the first position clockwise from OFF, a 10-ohm resistor, R1506, is connected in parallel with the secondary of the audio output transformer. At the same time, 68-ohm resistor R1505 is connected in series with the handset receiver and speaker. This results in the application of approximately $\frac{1}{8}$ of the input voltage across the speaker and handset. Figure 44 shows the positions of the switch and how the resistors are inserted to adjust the level of the signal. The circuit in A is discussed above. For the position of S1501A shown in B, the 68-ohm resistor is replaced by 33-ohm resistor R1501. This arrangement raises the level so that there is approximately $\frac{1}{4}$ of the input voltage across the speaker and handset. In C, the 10-ohm resistor is replaced by resistor R1504 (10 ohms) and the 33-ohm resistor is replaced by 10-ohm resistor R1502. The substitution results in approximately $\frac{1}{2}$ of the input voltage being applied to the speaker and handset. The last circuit (D) illustrates a direct connection from the a-f input to the handset and speaker so that there is no reduction in signal strength between the input and the handset and speaker.

69. Microphone and Retransmission Circuit
(fig. 45)

a. Microphone Circuit. Handset H–33/PT contains a carbon type microphone which is connected across the 150-ohm impedance winding (terminals 1 and 2) of transmitter microphone transformer T301. The connection is made to the transmitter through the radio set control, control cable, and cabinet. The lower leg of the connection contains a series resistor, R351, which is a part of a voltage divider located in the transmitter from B+ to ground. The other resistors in the divider are R324 and R325. A 2-volt d-c drop across resistor R351 supplies the necessary current for the microphone circuit. Resistor R351 is bypassed for audio frequencies by capacitor C330.

b. Retransmission Circuit. The retransmission circuit uses the same audio input transformer (T301) in the transmitter but requires a 600-ohm impedance. This impedance is provided across terminals 1 and 3 of the transformer. The output

from the receiver audio output transformer T121 is fed through interconnections in the receiver to Electrical Equipment Cabinet CY–938/VRC where it is applied across a series network consisting of resistors R801 and R802. The network is a voltage divider and impedance-matching circuit. The portion of the audio signal developed across resistor R802 is applied to the primary of transformer T301 (terminals 1 and 3). Resistor R802 is 680 ohms, and approximately matches the 600-ohm impedance of the transformer. Jumper connections from 1 to 10 and from 2 to 9 of terminal board TB801 permit the retransmission circuit to be disconnected when not needed. The jumper connections are located at the rear of Electrical Equipment Cabinet CY–938/VRC (fig. 16).

70. Receiver Mute Circuit
(fig. 46)

a. When push-to-talk operation is used, the antenna change-over relay (K301) in the transmitter switches the antenna from the receiver input to the transmitter output (fig. 50). The action removes the signal from the receiver except for noise and leakage from the transmitter (if it happens to be transmitting on a nearby frequency). To completely silence the receiver, a receiver muting circuit is used.

b. The circuit is controlled by a relay in the transmitter power supply; the relay is operated by the push-to-talk switch on the handset. All three transmitter power supplies use contacts 3 and 4 of the relay. A potential of +90 volts, developed across resistors R351, R324, and R325 in the transmitter, passes through interconnections to the relay contacts as shown in figure 50. From the relay it is split into two paths (in the cabinet); one path goes to the plate circuit of transmitter oscillator tubes V301 and V302; the other path goes to the receiver squelch tube (V124) grid.

c. When the power supply relay is closed (push-to-talk switch depressed), the +90-volt potential is applied to the oscillator plate circuit, causing it to oscillate. At the same time the potential is applied to the control grid of V124 through current limiting resistor R148. The high positive voltage on the control grid causes the tube to draw a heavier than normal current through its plate load resistor R142. When this occurs, the voltage at the plate of the tube becomes lower which in turn decreases the potential differences across resistors R143, R144, and R145. One side of resistor R145 is connected to −40 volts. With very little bucking voltage applied from the plate circuit of the squelch tube, the potential at the junction of resistors R144 and R145 approaches −40 volts. This high negative voltage is applied to the control grid circuits of the first audio and power amplifier stages (V121 and V122) through resistor R128. The high negative bias cuts off the audio tubes and effectively mutes the receiver. When the power supply relay contacts open, the transmitter is disabled and the receiver is able to operate. A jumper connection between terminals 3 and 4 of terminal board TB801 permits removal of the muting when desired. It should be removed for retransmission operation (fig. 16).

71. Radio Set AN/VRC-6Y Power and Control Circuits (6 volts)

a. General. The control and low-voltage power circuits are shown in figure 50. A 6-volt battery is connected to Electrical Equipment Cabinet CY–938/VRC through a heavy-current capacity cable. A battery with either its positive or negative terminal grounded can be connected to the radio set power circuit without affecting any of the low-voltage circuits. The B+ circuit to the transmitter is provided with a means of changing polarity to make the set adaptable to any vehicle polarity (fig. 31). After the source voltage enters the cabinet, one side is fused by 50-ampere fuse F801 to protect the vehicular power source. From the fuse, the current takes two paths: one to power switch S1501B in the radio set control (through the power supply and the cabinet), and the other to contactor K1202 in the transmitter power supply. On the other side of the line, contact is made with all common points that are to be switched into the circuit. Note that a jumper is inserted in the circuit between the power switch and the coil of relay K1203. This connection between terminals 1 and 2 of TB803 is used for the 6-volt radio set only. A second fuse, F1201 (upper-left part of figure 50), is connected in series with the major portion of the circuit. This fuse is located in the transmitter power supply, and protects all of the circuits in the radio set except the dynamotor d-c supply circuit. When the POWER switch is placed in the ON position, relay K1203 is energized, and the battery voltage is applied to all power and control circuits in the radio set

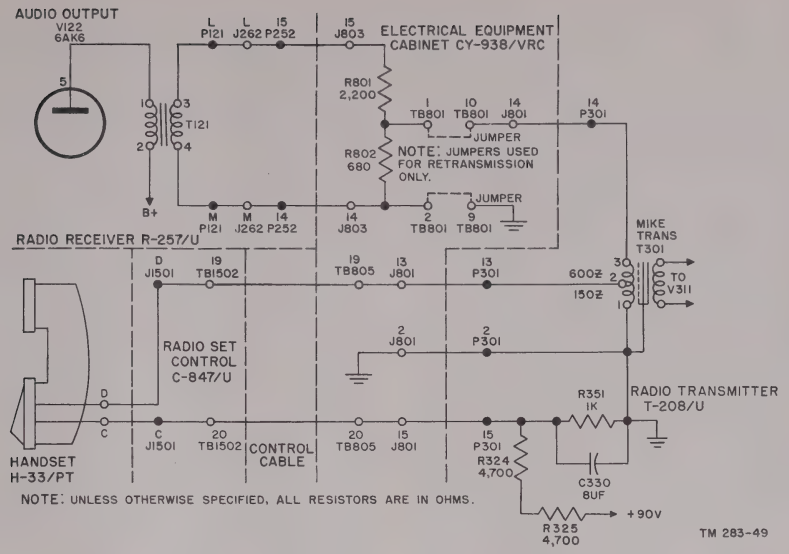


Figure 45. Microphone and retransmission audio circuits.

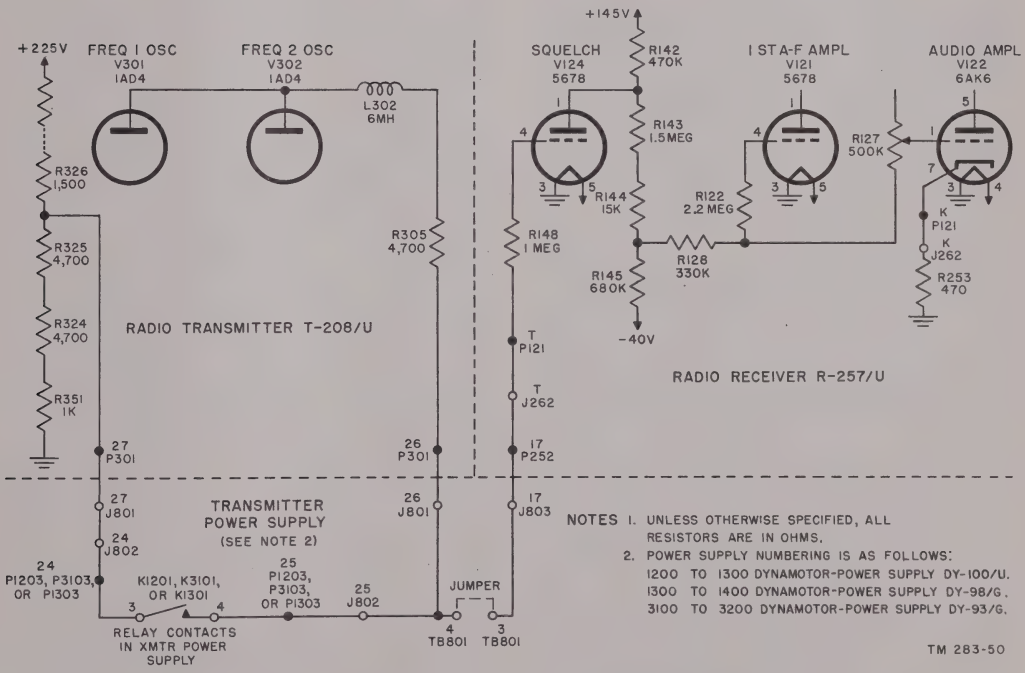


Figure 46. Muting circuit, simplified.

except the dynamotor circuit. Contactor K1202 in turn is energized by the closing of K1201 and completes the battery circuit to the dynamotor.

b. Receiver Circuits. Voltage is applied to the receiver power supply through the transmitter power supply, the cabinet, and the receiver proper (first circuit to right of the contacts of relay K1203 in figure 50). Fuse F2701 in the receiver power supply protects the receiver and receiver power supply. From the fuse, power is applied to a network containing two parallel branches. The first branch contains the receiver crystal oven E231, which receives its power through filter choke L241, and maintains the first high-frequency oscillator crystal at a constant temperature in order to stabilize its frequency. The second branch contains the receiver 6.3-volt tube filaments, V201 and V122, POWER indicator I 1501, and transformer T2701. Power for I 1501 is applied through the receiver, the cabinet, and the radio set control. I 1501 indicates that power is applied to the low- and high-voltage circuits in the receiver, and to the crystal oven in the transmitter. Under certain conditions (subpar. *c* below) I 1501 also may indicate that reduced power is applied to the transmitter filaments. Voltages for the 1.4-volt receiver filaments, and the receiver B+ and bias supplies are developed by secondary windings of transformer T2701 in the receiver power supply. For details on the receiver filament, B+, and bias circuits, see the receiver main schematic (fig. 61) or the instruction book for Radio Receiver R–257/U.

c. Transmitter Power Circuits. In the transmitter, the crystal oven is heated as in the receiver (second circuit to right of the contacts of relay K1203 in figure 50). If a jumper is connected from terminal 6 of relay K1201 to resistor R1202 (fourth circuit to right of the contacts of relay K1203), the transmitter tube filaments will operate continuously, at reduced voltage, as long as the POWER switch is ON. Power is applied to the filaments through the jumper, voltage-dropping resistors R1202 and R1201, voltage regulator tubes RT1201 and RT1202, and choke L1201 in the transmitter power supply, and through the cabinet. The same power that is applied to the filaments also is applied to FREQ 1-2 switch, S1503 in the radio set control. This switch selects one of two preset transmitter frequencies by controlling the application of filament power to transmitter oscillators V301 and V302. Up to this point, the receiver has been placed in operation, the transmitter tubes are heated (if a jumper is correctly connected in the transmitter power supply as indicated above), and the transmitter crystal oven is operating. The radio set is in a receiving condition and the transmitter is in a stand-by condition.

d. Methods of Transmitter Control. There are two switches and a relay which can initiate the change-over from reception to transmission. They are the push-to-talk switch on the handset, the TEST-OFF switch (S301) on the transmitter, and relay K271 in the receiver. The push-to-talk switch normally is used for routine operation. The TEST switch is used during tuning or alinement, when the transmitter is to be kept on for some time, thereby eliminating the necessity for holding the push-to-talk switch closed. The third method used to place the transmitter in operation is by means of relay K271 located in a modified Radio Receiver R–257/U. This relay is operated by the squelch circuit of the receiver, and when properly adjusted will close when the receiver is unsquelched (during reception of a signal). This method normally is used only for retransmission purposes. Jumper connections, in the cabinet and receiver, control this operation (par. 26*e*).

e. Transmitter Control Circuits. Upon closing the push-to-talk switch, TEST switch, or K271 relay contacts (third circuit to right of the contacts of relay K1203), the ground circuit to the coil of relay K1201 is completed and the relay is energized. This connects power to the transmitter tube filaments through contacts 2 and 7 of the relay, and places the filaments in operation. If the filaments previously have been connected to the power source as described in subparagraph *c* above, they now will operate at full voltage instead of reduced voltage. Three circuits are energized through contacts 5 and 6 of the relay. The first circuit contains relay K301 (located in the transmitter) which changes the antenna from the receiver to the transmitter. The second circuit contains TRANSMIT lamp I 1502 which is located on the radio set control and indicates that power is applied to the transmitter. Contactor K1202 in the third circuit is energized and connects the vehicular storage battery to the motor section of the dynamotor. The generator section of the dynamotor develops 405 volts which is applied across a voltage divider. The voltages

produced by the divider are applied to the transmitter as B+ and bias voltages. For details on the B+ and bias circuits, see the transmitter main schematic (fig. 62) or the instruction book for Radio Transmitter T–208/U. Since all of the filament, bias, and B+ voltages now are applied to the transmitter, it will operate until the push-to-talk switch is released. The mute contacts (3 and 4) of the relay can be connected into the circuit to silence the receiver if noise or leakage from the transmitter is present. The details of this circuit are given in paragraph 70.

72. Radio Set AN/VRC-6X Power and Control Circuits (12 volts)

a. The power and control circuits of the 12-volt version of the radio set (fig. 51) are almost identical in operation and connection with that of the 6-volt model. The differences between the models are required to reduce the source voltage (12 volts) to the voltage of the basic circuit (6 volts). A comparison of figures 50 and 51 will show the differences between the two radio sets. The differences between the two radio sets are discussed in subparagraph *b* below.

b. The transmitter oven voltage is dropped 6 volts by resistor R3113. The transmitter tube filaments are kept at their rated voltage by the insertion of resistor R3115. The coils of relays K3101 and K3103 and contactor K1302 are made for 12 volts so that they operate directly from the source voltage without dropping resistors. Power for the receiver crystal oven, 6.3-volt tube filaments, and POWER indicator is supplied by a secondary winding of transformer T2801 instead of directly from the power source. Note that the jumper between the power switch and the coil of relay K3103 is connected between terminals 3 and 4 of TB802 instead of between terminals 1 and 2 of TB803 as in the 6-volt model. This was done to prevent damage to the equipment if a 6-volt power supply is used with a 12-volt vehicular system. In operation, the switching actions are the same as indicated for the 6-volt model.

73. Radio Set AN/VRC-6 Power and Control Circuits (24 volts)

a. The low-voltage circuits of Radio Set AN/VRC–6 are not the same as those used in the other two models but are similar in many respects. In this 24-volt version (fig. 52), a relay is not needed to control the input to the receiver and other control relays, since with the same power input as the other two models the set requires much less current. Power switch S1501B in Radio Set Control C–847/U has sufficient current-carrying capacity to handle all the circuits except the dynamotor input. Note that a jumper is connected between terminals 2 and 3 of TB803 (near the right side of the power switch) instead of between terminals 1 and 2 of TB803, or terminals 3 and 4 of TB802 which are used in the other two sets. This connection makes it possible to use the power switch for the circuits which were connected to either relay K3103 or K1203 in the other two sets.

b. Crystal oven heaters E231 and HR301 are operated directly from the 24-volt source. These ovens have elements that are capable of operating on either 6 or 24 volts if properly connected. The connections are made automatically when the correct power supplies are plugged into the system. In the transmitter, all the tube filaments receive their voltages from the secondary windings of power transformer T1301 instead of directly from the power source. The voltage developed in one secondary winding is applied directly to the 6.3-volt filaments; the voltage developed in the other secondary winding is rectified and filtered before it is applied to the 1.3-volt filaments. A fuse, F1301, is provided for dynamotor D1301. Operation of the relays and switches is similar to the operation of equivalent relays and switches in the 6- and 12-volt models.

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

Note. This chapter contains information for field maintenance. The amount of repair that can be performed by units having field maintenance responsibility is limited only by the tools and test equipment available and by the skill of the repairman.

Section I. TROUBLE SHOOTING AT FIELD MAINTENANCE LEVEL

Warning: When servicing Radio Set AN/VRC–6(*) be extremely careful because of exposure to high voltage. Voltages as high as 400 volts are present at certain points in Radio Transmitter T–208/U and its associated power supply. It is also possible to come in contact with these high voltages when the rear cover of Electrical Equipment Cabinet CY–938/VRC is removed. Be sure that all power is turned off before touching any of the high voltage connections.

74. Scope

This chapter contains a general field maintenance procedure for system trouble shooting and detailed field maintenance instructions for Electrical Equipment Cabinet CY–938/VRC and Radio Set Control C–847/U. Consult the following publications for detailed information related to the maintenance of the other radio set components.

Component	Publication
Radio Transmitter T–208/U.	Transmitter instruction book.
Radio Receiver R–257/U.	Receiver instruction book.
Dynamotor-Power Supplies DY–100/U, DY–93/G, and DY–98/G.	Transmitter power supply instruction book.
Power Supplies PP–867/U, PP–868/U, and PP–869/U.	Receiver power supply instruction book.

75. Trouble-shooting Procedures

The first step in servicing a defective radio set is to sectionalize the fault. Sectionalization means tracing the fault to the major component or circuit responsible for the abnormal operation of the set. The second step is to localize the fault. Localization means tracing the fault to the defective part responsible for the abnormal conditions. Some faults such as burned-out resistors, r-f arcing, and shorted transformers often can be located by sight, smell, or hearing. The majority of faults, however, must be localized by voltage and resistance checks.

76. Trouble-shooting Data

Take advantage of the material supplied in this instruction book. It will help in the rapid sectionalization of faults. Diagrams showing the connections of the system, control circuits of the power source, and schematic diagrams of each unit are provided in addition to those which will be found in the individual instruction books. By tracing the key circuits through switches, terminal boards, and cables, troubles usually can be found very readily. During the trouble-shooting procedures it may be helpful to consult chapter 4 for the theory of circuit operations in order to locate the trouble more rapidly and to prevent unnecessary work. Consult the trouble-shooting data in the component instruction books and also the following data in this instruction book.

Fig. No.	Description
Fig. 16	Radio Set AN/VRC–6(*), connections.
Fig. 21	Radio Transmitter T–208/U, test points and alinement locations.
Fig. 22	Radio Receiver R–257/U, front panel test points.
Fig. 23	Dynamotor-power supply front panel test points.
Fig. 29	Electrical Equipment Cabinet CY–938/VRC, interior view.

76. Trouble-shooting Data (contd)

Fig. No.	Description
Fig. 30	Radio Transmitter T–208/U, tube location.
Fig. 31	Transmitter power supply fuse and vibrator location.
Fig. 32	Radio Receiver R–257/U, tube location.
Fig. 33	Receiver power supply fuse and vibrator location.
Fig. 42	Radio Set Control C–847/U, schematic diagram.
Fig. 49	Electrical Equipment Cabinet CY–938/VRC, schematic diagram.
Fig. 50	Radio Set AN/VRC–6Y, power and control circuits.
Fig. 51	Radio Set AN/VRC–6X, power and control circuits.
Fig. 52	Radio Set AN/VRC–6, power and control circuits.
Fig. 53	Resistor color codes.
Fig. 54	Capacitor color codes.
Fig. 55	Dynamotor-Power Supply DY–100/U, schematic diagram.
Fig. 56	Dynamotor-Power Supply DY–93/G, schematic diagram.
Fig. 57	Dynamotor-Power Supply DY–98/G, schematic diagram.
Fig. 58	Power Supply PP–869/U, schematic diagram.
Fig. 59	Power Supply PP–868/U, schematic diagram.
Fig. 60	Power Supply PP–867/U, schematic diagram.
Fig. 61	Radio Receiver R–257/U, schematic diagram.
Fig. 62	Radio Transmitter T–208/U, schematic diagram.
Fig. 63	Electrical Equipment Cabinet CY–938/VRC, wiring diagram.
Fig. 64	Electrical Equipment Cabinet CY–938/VRC, voltage and resistance diagram.

77. Trouble-shooting Chart for Radio Set AN/VRC-6(*)

Symptom	Probable cause	Correction
1. Entire set fails to operate.	1. (a) Electrical Equipment Cabinet CY-938/VRC. (b) Radio Set Control C–847/U. (c) Transmitter Power Supply.	1. (a) (b) (c) Refer to paragraph 78a.
2. Transmitter operates on frequency 2 only.	2. (a) Radio Set Control C–847/U. (b) Control cable. (c) Electrical Equipment Cabinet CY-938/VRC. (d) Radio Transmitter T–208/U.	2. (a) (b) (c) Refer to paragraph 78b. (d) Refer to the instruction book for Radio Transmitter T–208/U and check the transmitter oscillator circuits.
3. Transmitter operates on frequency 1 only.	3. (a) Radio Set Control C–847/U. (b) Control cable. (c) Electrical Equipment Cabinet CY–938/VRC. (d) Radio Transmitter T–208/U.	3. (a) (b) (c) Refer to paragraph 78 c. (d) Refer to the instruction book for Radio Transmitter T–208/U and check the transmitter oscillator circuits.
4. Transmitter operates when TEST-OFF switch is in the TEST position, but will not operate when the push-to-talk switch is pressed.	4. (a) Electrical Equipment Cabinet CY–938/VRC. (b) Control cable. (c) Radio Set Control C–847/U. (d) Handset H–33/PT.	4. (a) (b) (c) Refer to paragraph 78 d. (d) Substitute with another handset.

77. Trouble-shooting Chart for Radio Set AN/VRC-6(*)—(contd)

Symptom	Probable cause	Correction
5. Transmitter operates when the push-to-talk switch on the handset is pressed, but will not operate when the transmitter TEST-OFF switch is in the TEST position.	5. (a) Electrical Equipment Cabinet CY–938/VRC. (b) Radio Transmitter T–208/U.	5. (a) Refer to paragraph 78 e. (b) Refer to the instruction book for Radio Transmitter T–208/U.
6. Transmitter will not operate when used for retransmission purposes.	6. (a) Electrical Equipment Cabinet CY–938/VRC. (b) Improper antenna or jumper connections. (c) Receiver relay K271.	6. (a) Refer to paragraph 78 f. (b) Refer to paragraph 37 for proper antenna and jumper connections. (c) Replace relay K271
7. Transmitter operates but receiver will not operate.	7. (a) Receiver Power Supply. (b) Electrical Equipment Cabinet CY–938/VRC. (c) Radio Receiver R–257/U.	7. (a) Refer to paragraph 78 g (1). (b) Refer to paragraph 78 g (2). (c) Refer to the receiver instruction book.
8. Receiver operates but transmitter does not operate.	8. (a) Transmitter Power Supply. (b) Electrical Equipment Cabinet CY–938/VRC. (c) Radio Set Control C–847/U. (d) Radio Transmitter T–208/U.	8. (a) Refer to the instruction book for the Dynamotor-Power Supplies and check the output voltage. (b) (c) Refer to paragraph 78 h. (d) Refer to the transmitter instruction book.
9. Receiver will not squelch.	9. (a) Electrical Equipment Cabinet CY–938/VRC. (b) Control cable. (c) Radio Set Control C–847/U.	9. (a) (b) (c) Refer to paragraph 78 i.
10. TRANSMIT light does not light.	10. (a) Radio Set Control C–847/U. (b) Electrical Equipment Cabinet CY–938/VRC.	10. (a) (b) Refer to paragraph 78 j.
11. POWER light does not light.	11. (a) Electrical Equipment Cabinet CY–938/VRC. (b) Radio Set Control C–847/U.	11. (a) (b) Refer to paragraph 78 k.

78. Resistance and Voltage Measurements for Radio Set AN/VRC-6 (*)

Follow the steps given in the starting procedure (par. 34) when making voltage measurements on Radio Set AN/VRC–6(*). The push-to-talk relay (K1201, K1301, or K3101) must be energized before operating voltages will be applied to the transmitter. For resistance or continuity measurements it is necessary to disconnect the power from the set. Refer to the power and control circuits diagram (fig. 50, 51, or 52) and to the voltage and resistance diagram (fig. 64) when making these measurements. All voltages are measured to ground. The symbol numbers for the various units are as follows:

From	To	Unit
100	300	Radio Receiver R–257/U.
300	400	Radio Transmitter T–208/U.
800	900	Electrical Equipment Cabinet CY–938/VRC.
1200	1300	Dynamotor-Power Supply DY–100/U.
1300	1400	Dynamotor-Power Supply DY–98/G.
3100	3200	Dynamotor-Power Supply DY–93/G.
1500	1600	Radio Set Control C–847/U.
2700	2800	Power Supply PP–869/U.
2800	2900	Power Supply PP–868/U.
2900	3000	Power Supply PP–867/U.

a. If the radio set is completely inoperative, check the following:

(1) Power source (6-, 12-, or 24-volt battery).

(2) Check for proper input voltage between terminals 1 and 2 of TB806. Check fuse F801 by measuring for proper voltage between terminal 1 of J802 and ground (fig. 16).

(3) Check transmitter power supply fuse F1201, F3101, or F1302 (6-, 12-, or 24-volt systems, respectively) by measuring for proper voltage in the cabinet between terminal 18 of J802 and ground.

(4) Check power switch S1501B and control cable by measuring for proper voltage in the cabinet between terminal 16 of TB-805 and ground.

(5) Check cabinet jumper connections between terminals 1 and 2 of TB803 (6-volt system), terminals 3 and 4 of TB802 (12-volt system), or terminals 2 and 3 of TB803 (24-volt system).

(6) (*a*) On the 6-volt system, check for 6 volts on terminal 2 of J803.

(*b*) On the 12-volt system, check for 12 volts on terminal 19 of J803.

(c) On the 24-volt system, check for 24 volts on terminal 22 of J802.

b. If the transmitter operates when the FREQ 1-2 switch on the radio set control is set to position 2 but will not operate when set to position 1, check the following:

(1) Disconnect the control cable from terminal 5 of TB1501 and check cable for continuity to terminal 5 of TB804.

(2) Check in the cabinet for continuity between terminal 5 of TB804 and terminal 11 of J801.

(3) Check in the radio set control for continuity between terminals 5 and 7 of TB1501 with the FREQ 1-2 switch in position 1.

(4) Set the FREQ switch on Radio Set Control C–847/U to position 1 and check for a 1.3-volt reading on each of the following terminals:

(*a*) Terminal 5 of TB1501.

(*b*) Terminal 5 of TB804.

(*c*) Terminal 11 of J801.

c. If the transmitter operates when the FREQ 1-2 switch is set to position 1 but will not operate when set to position 2 check the following:

(1) Disconnect the control cable from terminal 6 of TB1501 and check the cable for continuity to terminal 6 of TB804.

(2) Check in the cabinet for continuity between terminal 6 of TB804 and terminal 12 of J801.

(3) Check in the radio set control for continuity between terminals 6 and 7 of TB1501 with the FREQ 1-2 switch in position 2.

(4) Set the FREQ switch on Radio Set Control C–847/U to position 2 and check for a 1.3-volt reading on each of the following terminals:

(*a*) Terminal 6 of TB1501.

(*b*) Terminal 6 of TB804.

(*c*) Terminal 12 of J801.

d. If the transmitter operates when the TEST-OFF switch is in the TEST position but will not operate when the push-to-talk switch is pressed, press the switch and check for continuity from terminal 17 of J802 to each of the following terminals:

(1) Terminal 18 of TB805.

(2) Terminal 18 of TB1502.

(3) Terminal F of J1501.

(4) Terminal H of J1501.

(5) Terminal 10 of TB1501.

(6) Terminal 10 of TB804.

(7) Terminal 2 of J802.

e. If the transmitter operates when the push-to-talk switch is pressed but will not operate when the TEST-OFF switch is in the TEST position, place the TEST-OFF switch in the TEST position and check for continuity from terminal 17 of J802 to each of the following terminals:

(1) Terminal 17 of J801.

(2) Terminal 2 of J801.

f. If the transmitter will not operate when used for retransmission purposes, be sure jumpers are connected from terminal 5 to terminal 6 of TB801 and from terminal 8 to terminal 9 of TB801.

(1) Check for continuity from terminal 17 of J802 to each of the following terminals:
(*a*) Terminal 5 of TB801.
(*b*) Terminal 6 of TB801.
(*c*) Terminal 27 of J803.

(2) Check for continuity from terminal 28 of J803 to each of the following terminals:
(*a*) Terminal 8 of TB801.
(*b*) Terminal 9 of TB801.
(*c*) Terminal 2 of J802.

g. If the transmitter operates but the receiver will not operate, check the following:

(1) Receiver power supply fuse F2701, F2801, or F2901 (6-, 12-, 24-volt systems respectively).

(2) Antenna connections to cabinet (P801) and antenna connections in the cabinet between the transmitter (terminal A1 of J801) and receiver (terminal A2 of J803). Check continuity between terminals A1 and A2.

h. If the receiver operates but the transmitter will not operate, check the following:

(1) Check for a 6-volt reading on each of the following terminals:
(*a*) Terminal 14 of J802.
(*b*) Terminal 29 of J801.

(2) Check for a 1.3-volt reading on each of the following terminals:
(*a*) Terminals 16 and 28 of J802.
(*b*) Terminals 16 and 28 of J801.
(*c*) Terminal 7 of TB804.
(*d*) Terminal 7 of TB1501.

i. If the receiver will not squelch, check the following:

(1) Check the resistance of the SQUELCH ON-OFF control between the center tap (terminal 8 of TB804 in the cabinet) and ground. The resistance should vary from zero to 500,000 ohms as the control is rotated.

(2) Remove the control cable wires from terminals 8, 9, and 10 of TB1501 and check for continuity between each wire and its termination on TB805 in the cabinet (terminals 8, 9, and 10, respectively).

(3) Check for proper connections on terminals 8, 9, and 10 of TB1501 and TB805.

j. If the TRANSMIT lamp does not light when the push-to-talk switch is depressed, check the following:

(1) Check the TRANSMIT lamp by substituting a lamp known to be good.
(2) Check for a 6-volt reading on each of the following terminals:
(*a*) Terminal 4 of TB804.
(*b*) Terminal 4 of TB1501.

(3) Check R1508. Check for continuity from terminal 10 of TB1501 to each of the following terminals:
(*a*) Terminal 10 of TB804.
(*b*) Terminal 2 of J802.

k. If the POWER lamp does not light when the power switch (S1501B) is turned on, check the following:

(1) Check for continuity from terminal 6 of J803 to each of the following terminals:
(*a*) Terminal 14 of TB805.
(*b*) Terminal 14 of TB1502.

(2) Check R1507 and I 1501. Check for continuity from terminal 10 of TB1501 to each of the following terminals:
(*a*) Terminal 10 of TB804.
(*b*) Terminal 2 of J802.

Section II. TROUBLE SHOOTING RADIO SET CONTROL C-847/U AND ELECTRICAL EQUIPMENT CABINET CY-938/VRC

79. Test Equipment Required

Electronic Multimeter TS–505/U can be used for trouble shooting Radio Set Control C–847/U and Electrical Equipment Cabinet CY–938/VRC. Instructions for the use of this meter are contained in TM 11–5511.

80. Localizing Trouble

After the trouble has been sectionalized to Radio Set Control C–847/U or Electrical Equip-

ment Cabinet CY–938/VRC, the defective item can be determined from the trouble-shooting charts (pars. 81 and 82). Check to see that all cable connections from the radio set control to the cabinet are correct and that all control settings are in the proper position for normal operation. When checking the possible defective item listed in the trouble-shooting chart, always check for defective wiring. Refer to figures 29, 47, and 48 for identification of the components.

81. Resistance Measurements of Radio Set Control C-847/U

Resistance measurements in Radio Set Control C–847/U are taken across the terminals of terminal boards TB1501 and TB1502. In order to take these measurements, the control cable must be disconnected from the terminal boards. The measurements are given for groups of terminals which are in the same circuit, thereby indicating the readings to be expected for each control circuit if it is functioning properly. Be sure to set the controls as shown in the chart to get the specified readings. Refer to figure 47 for the location of the terminal boards.

Terminals measured	Related control or part	Position	Reading (ohms)
19-20	Handset H–33/PT.	Disconnected.	Infinity
10-14	POWER pilot lamp I 1501.	In socket.	35
16-17 13-15	VOLUME-OFF switch S1501.	Any position except OFF.	0
4-10	TRANSMIT pilot lamp I 1502.	In socket.	35
10-18	Handset H–33/PT.	Disconnected.	Infinity
9-10	SQUELCH switch S1504.	OFF.	0
8-10	SQUELCH potentiometer R1509.	Maximum counterclockwise,	500K
		maximum clockwise.	0
6-7	FREQ switch S1503.	2	0
		1	Infinity
5-7	FREQ switch S1503.	1	0
		2	Infinity
11-12	VOLUME-OFF S1501.	First position from OFF.	8.8
		Second position from OFF.	8
		Third position from OFF.	5.5
1-2, 2-3	None.	None.	Infinity

82. Continuity Tests and Resistance Measurements for Electrical Equipment Cabinet CY-938/VRC

The cabinet has no switches or variable parts, therefore, the only troubles that can occur are either short or open circuits. These troubles can be discovered readily and corrected by making continuity checks between the connectors and terminal boards on the rear of the cabinet. Use the lowest resistance range on the ohmmeter for making continuity tests. When trouble shooting the cabinet, refer to the schematic diagram (fig. 46). The receiver, transmitter, and transmitter power supply should be removed from the cabinet for these tests. Also remove all terminal board jumper connections. The following described tests are grouped according to their function in the radio set. Select the group or groups containing the trouble and perform the continuity and resistance tests as indicated. Check for continuity between the terminals as shown.

Note. Continuity refers to an ohmmeter reading of less than .1 ohm.

a. Filament and Heater Circuits.

Connector	Terminal		Connector	Terminal
J802	10	and	J801	10
J802	15	and	J801	1
J802	28	and	J801	28
J802	28	and	TB804	7
J802	16	and	J801	16

b. Bias and B+ Voltages.

Connector	Terminal		Connector	Terminal
J802	9	and	J801	9
J802	6	and	J801	6
J802	5	and	J801	5
J802	4	and	J801	4
J802	3	and	J801	3
J802	25	and	J801	26
J802	25	and	TB801	4
J802	24	and	J801	27

c. A-c Power Input.

Connector	Terminal		Connector	Terminal
J802	11	and	J803	3
J802	11	and	TB803	5
J802	12	and	J803	4
J802	12	and	TB803	6
J802	13	and	J803	5
J802	13	and	TB805	13

d. Battery Circuits.

Connector	Terminal		Connector	Terminal
J802	21	and	J803	2
J802	20	and	J803	19
J802	22	and	J803	24
J802	22	and	TB803	3
J802	1	and	TB806	1*
J802	18	and	TB805	17

*This test checks continuity through fuse F801.

e. Power Contactor Circuits.

Connector	Terminal		Connector	Terminal
J802	19	and	TB803	1
J802	30	and	TB802	4

f. Push-to-talk Circuits.

Connector	Terminal		Connector	Terminal
J802	17	and	J801	17
J802	17	and	TB801	5
J802	17	and	TB805	18
J802	14	and	J801	29
J802	14	and	TB804	4

g. Transmitter Crystal Oven Heaters.

Connector	Terminal		Connector	Terminal
J802	7	and	J801	7
J802	8	and	J801	8

h. Transmitter and Receiver Antenna Circuits.

Connector	Terminal		Connector	Terminal
J801	A1	and	J803	A2
J801	A2	and	J801	—

i. Transmitter Modulator Circuit.

Connector	Terminal		Connector	Terminal
J801	13	and	TB805	19
J801	14	and	TB801	10
J801	15	and	TB805	20

j. Transmitter Frequency-changing Circuit.

Connector	Terminal		Connector	Terminal
J801	11	and	TB804	5
J801	12	and	TB804	6

k. Receiver Relay Circuit.

Connector	Terminal		Connector	Terminal
J803	27	and	TB801	6
J803	28	and	TB801	7
J803	29	and	TB801	8
J803	11	and	TB802	6

Connector	Terminal		Connector	Terminal
J803	12	and	TB802	10
J803	13	and	TB802	2

l. Receiver Squelch Circuit.

Connector	Terminal		Connector	Terminal
J803	8	and	TB804	8
J803	9	and	TB804	9
J803	17	and	TB801	3

m. Receiver Audio-output Circuit.

Connector	Terminal		Connector	Terminal
J803	14	and	TB805	11
J803	14	and	TB801	2
J803	15	and	TB802	9

n. Receiver Audio-output Circuit Resistance Measurements.

Connector	Terminal		Connector	Terminal	Resistance
TB801	1	and	TB801	2	680 ohms
TB801	1	and	TB802	9	2,200 ohms
TB801	2	and	TB802	9	2,880 ohms

o. Receiver Pilot and Call Lamp Circuits.

Connector	Terminal		Connector	Terminal
J803	10	and	TB802	1
J803	6	and	TB805	14
J803	6	and	TB802	5

p. Terminal Board Interconnections.

Connector	Terminal		Connector	Terminal
TB802	3	and	TB803	2
TB802	3	and	TB805	16
TB802	8	and	TB805	12
TB803	4	and	TB805	15

q. Ground Connections.

Connection		Connector	Terminal
Chassis ground	and	J801	2
Chassis ground	and	J802	2
Chassis ground	and	J803	1
Chassis ground	and	TB801	9
Chassis ground	and	TB802	7
Chassis ground	and	TB804	10
Chassis ground	and	TB806	2

Section III. REPAIRS

83. Replacement of Parts

a. General. For information concerning the replacement of parts in the transmitter, receiver, or either power supply, consult the specific component instruction book. The instructions which follow are for replacement of parts in Radio Set Control C–847/U and Electrical Equipment Cabinet CY–938/VRC.

b. Radio Set Control C–847/U (fig. 47). The pilot lamps can be changed by unscrewing the jewel assembly of the POWER and TRANSMIT sockets from the front panel. Push in the bulb and turn counterclockwise to release it from the socket. Replace by reversing the procedure. Before any of the front panel controls can be removed, the knobs first must be taken from the control shaft. The knobs are held to the shaft by standard screws. Once the knobs are off use the following procedure when removing the controls.

(1) Loosen the 8 captive screws on the rear cover and remove the cover.

(2) Disconnect all wires from the control except those which go from lug to lug on the control. Mark each wire so that it can be reconnected properly when the control is replaced.

(3) Remove the front panel nut that secures the control.

(4) Wire the new control with the jumpers and resistors exactly as the old one was wired.

(5) Mount the control by reversing the procedure at subparagraph (3) above and connect all the necessary wiring.

(6) Sometimes it may be necessary to reverse the sequence of subparagraphs (2) and (3) above to facilitate disconnection of the wiring.

(7) The pilot lamp sockets are removed in a similar manner.

(8) The terminal boards each are secured by two screws.

c. Electrical Equipment Cabinet CY–938/VRC (figs. 29 and 48). The trunk-type latches on the cabinet each are held by two screws. Removal of the screws allows replacement of the latches. Antenna coaxial connector P801 is disconnected from Jack J804 by turning it ¼ turn counterclockwise. To remove the terminal boards of jacks J801, J802, and J803, follow the procedure below:

(1) Unsolder all wiring to the terminal board or jack. Mark each wire so that it can be replaced correctly.

(2) Take out the four screws and remove the board or jack.

(3) Reverse the procedure to replace the boards and jacks.

(4) Make sure all connections are tight, especially the ground connections to the cabinet.

84. Refinishing

Instructions for rustproofing and touch-up painting are given in paragraph 52. Instructions for refinishing badly marred surfaces are given in TM 9–2851.

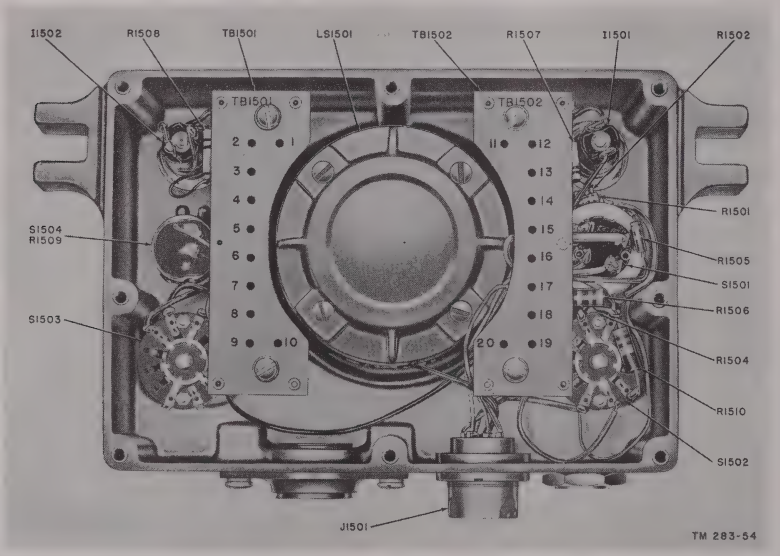


Figure 47. Radio Set Control C–847/U, rear view with cover removed.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

85. Disassembly

The following instructions are recommended as a guide for preparing the radio set for transportation and storage.

a. Disconnect Handset H–33/PT from Radio Set Control C–847/U.

b. Disconnect the coaxial cable from the antenna and Electrical Equipment Cabinet CY–938/VRC. Coil up this cable for packing.

c. Remove the antenna and antenna mount from the vehicle.

d. Disconnect the battery cable from the battery and unfasten it from the vehicle so that it is attached only at the cabinet.

e. Remove the radio set control from the mounting bracket. Remove the back cover and disconnect the control cable by pulling the cable leads from their jacks. Replace the rear cover on the control.

f. Remove the control bracket from the vehicle.

g. Remove the front cover from the cabinet. Take Radio Receiver R–257/U from the cabinet. Disconnect the battery cables and replace the receiver and front cover.

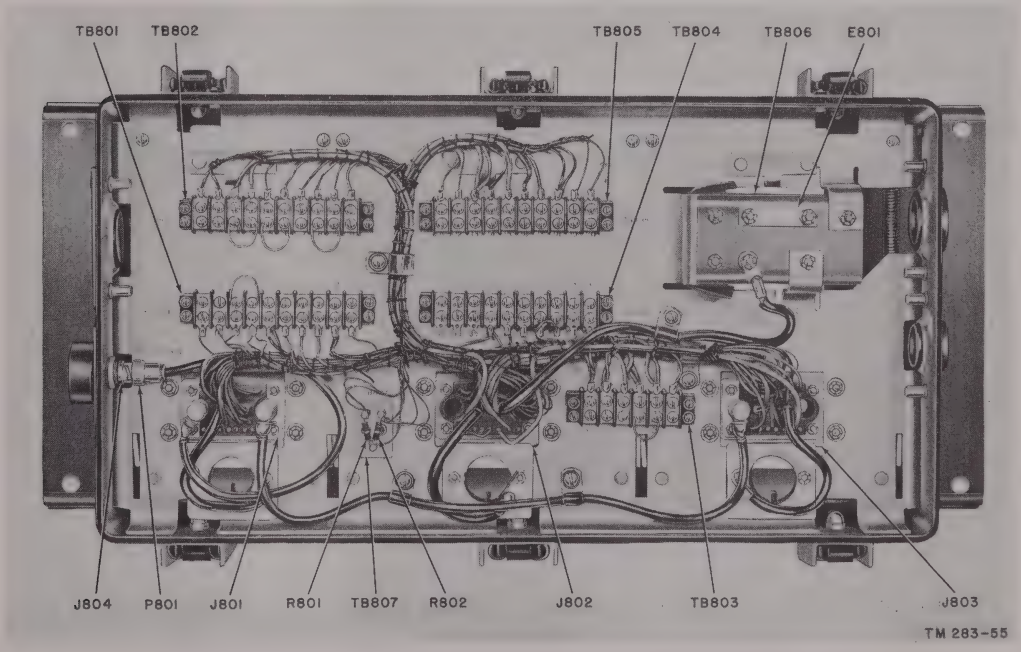


Figure 48. Electrical Equipment Cabinet CY–938/VRC, rear view with cover removed.

h. Remove the four mounting bolts that secure the cabinet to Electrical Equipment Rack MT–1236/VRC and remove the cabinet from the vehicle.

i. Remove the rear cover from the cabinet and disconnect the leads of the control cable. Then pull the control cable away from the cabinet. Replace the rear cover.

j. Unbolt the rack from the vehicle.

86. Repacking for Shipment or Limited Storage

a. The exact procedure in repacking for shipment or limited storage depends on how much original packing material was saved or what new material is available. It also depends on the conditions under which the radio set is to be shipped or stored. Repack the equipment by reversing the instructions given in paragraph 25 if possible. When the original cases and cartons are not available, try to duplicate the original packing.

b. Whenever practicable, place a dehydrating agent such as silica gel inside the chest. Do not use old dehydrating agents since they will offer no protection against damage to the equipment from moisture. Protect the packaging with a waterproof sealing compound or tape. Always provide at least 3 inches of excelsior padding or similar material between the inner cartons and the packing case.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

87. General

The demolition procedures outlined in paragraph 88 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

88. Methods of Destruction

a. Smash. Smash the crystals, controls, tubes, coils, switches, capacitors, transformers, and handsets, using axes, handaxes, hammers, crowbars, or other heavy tools.

b. Cut. Cut cords, handsets, and wiring, using axes, handaxes, or machetes.

c. Burn. Burn cords, resistors, capacitors, coils, wiring, and technical manuals, using gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panels, cabinets, and chassis.

e. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

f. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes, or other holes, or throw them into streams.

g. Destroy. Destroy everything.

APPENDIX I

REFERENCES

Note. For availability of items listed, check SR 310–20–3 and SR 310–20–4. Check Department of the Army Supply Catalog SIG 1, Introduction and Index, for Signal Corps Supply Catalog.

1. Army Regulations

AR 380–5	Military Security (Safeguarding Security Information).
AR 750–5	Maintenance of Supplies and Equipment (Maintenance Responsibilities and Shop Operation).

2. Supply Bulletins

SB 11–6	Dry Battery Supply Data.
SB 11–47	Preparation and Submission of Requisitions for Signal Corps Supplies.

3. Auxiliary Equipment and Test Equipment

NAVSHIPS 91,274	Tube Tester TV–3/U.
NAVSHIPS 91,269	Electronic Multimeter ME–6A/U.
NAVSHIPS 91,272	Oscilloscope OS–8A/U.
TM 11–300	Frequency Meter Sets SCR–211–A, B, C, D, E, F, J, K, L, M, N, O, P, R, T, AA, AC, AE, AF, AG, AH, AJ, AK, AL.
TM 11–303	Test Sets I–56–C, I–56–D, I–56–H, and I–56–J.
TM 11–321	Technical Manual for Test Set I–56–E.
TM 11–472	Repair and Calibration of Electrical Measuring Instruments.
TM 11–1257	Signal Generator AN/URM–48.
TM 11–2524	Oscillators I–151–A and I–151–E.
TM 11–2526	Oscilloscope BC–1060–A.
TM 11–2613	Voltohmmeter I–166.
TM 11–2624B	Voltohmmeters TS–294/U, TS–294B/U, and TS–294C/U.
TM 11–2626	Test Units I–176, I–176–A, and I–176–B.
TM 11–2627	Tube Tester I–177 and I–177–A.
TM 11–2684A	Audio Oscillator TS–382A/U.
TM 11–4700	Electrical Indicating and Measuring Instruments, Repair Instructions.
TM 11–5018	Signal Generator TS–588/U.
TM 11–5043	Analyzer 7M–3/U.
TM 11–5044	Frequency Meter TS–174B/U.
TM 11–5511	Electronic Multimeter TS–505/U.
TM 11–5527	Multimeter TS–352/U.

4. Painting, Preserving, and Lubrication

TB SIG 13	Moistureproofing and Fungiproofing Signal Corps Equipment.
TB SIG 69	Lubrication of Ground Signal Equipment.
TM 9–2851	Painting Instructions for Field Use.

5. Camouflage, Decontamination, and Demolition

FM 5–20	Camouflage, Basic Principles.
FM 5–25	Explosives and Demolitions.
TM 3–220	Decontamination.

6. Other Publications

FM 24–18	Field Radio Techniques.
FM 72–20	Jungle Warfare.
SR 310–20–3	Index of Training Publications.
SR 310–20–4	Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SR 310–20–5	Index of Administrative Publications.
SR 700–45–5	Unsatisfactory Equipment Report (Reports Control Symbol CSGLD–247).
SR 745–45–5 NAV DEPT SERIAL 85P00 AFR 71–4	Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD–66 (Army), SandA–70–6 (Navy), and AF–MC–U2 (Air Force)).
TB SIG 4	Methods for Improving the Effectiveness of Jungle Radio Communication.
TB SIG 25	Preventive Maintenance of Power Cords.
TB SIG 54	Working through Jamming with Frequency Modulated Radio Sets. (NOTE: USE ON FM SETS ONLY).
TB SIG 66	Winter Maintenance of Signal Equipment.
TB SIG 72	Tropical Maintenance of Ground Signal Equipment.
TB SIG 75	Desert Maintenance of Ground Signal Equipment.
TB SIG 123	Preventive Maintenance Practices for Ground Signal Equipment.
TB SIG 178	Preventive Maintenance Guide for Radio Communication Equipment.
TB SIG 219	Operation of Signal Equipment at Low Temperatures.
TB SIG 223	Field Expedients for Wire and Radio.
TM 9–2857	Storage Batteries Lead-Acid Type.
TM 11–314	Antennas and Antenna Systems.
TM 11–415	Dry Batteries.
TM 11–430	Batteries for Signal Communication. Except those pertaining to Aircraft.
TM 11–455	Radio Fundamentals.
TM 11–483	Suppression of Radio Noises.
TM 11–661	Electrical Fundamentals (Direct Current).
TM 11–662	Theory and Application of Electron Tubes.
TM 11–681	Electrical Fundamentals (Alternating Current).
TM 11–4000	Trouble Shooting and Repair of Radio Equipment.

APPENDIX II

IDENTIFICATION TABLE OF PARTS

Note. The fact that a part is listed in this table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as a specific T/O&E, T/A, SIG 7 & 8, list of allowances of expendable material or another authorized supply basis. The Department of the Army Supply Catalog applicable to the equipment covered in this manual is SIG 7 & 8–AN/VRC–6. For an index of available supply catalogs in the Signal portion of the Department of the Army Supply Catalog, see the latest issue of SIG 1, Introduction and Index.

1. Identification Table of Parts for Radio Set AN/VRC-6(*)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	RADIO SET AN/VRC–6Y: oper freq 25 to 50 mc; F3 type emission; 30 w output; oper power requirements, 6 v d-c at 40 amp; moisture and fungi resistant; c/o Radio Receiver R–257/U, Radio Transmitter T–208/U, Dynamotor-Power Supply DY–100/U, Power Supply PP–869/U, Radio Set Control C–847/U, Electrical Equipment Cabinet CY–938/VRC, Electrical Equipment Rack MT–1236/VRC, Special Purpose Electrical Cable Assembly CX–2341/U, Special Purpose Electrical Cable Assembly CX–2342/U, Handset H–33/PT; MIL spec #N–11539; Motorola, Inc. part #201V1200.	Provides two-way mobile communication in installations supplying a 6-volt d-c source of power.	2S4502–64
	RADIO SET AN/VRC–6X: oper freq 25 to 50 mc; F3 type emission; 30 w output; oper power requirements 12 v d-c at 20 amp; moisture and fungi resistant; c/o Radio Receiver R–257/U, Radio Transmitter T–208/U, Dynamotor-Power Supply DY–93/G, Power Supply PP–868/U, Electrical Equipment Cabinet CY–938/VRC, Electrical Equipment Rack MT–1236/VRC, Radio Set Control C–847/U, Special Purpose Electrical Cable Assembly CX–2341/U, Special Purpose Electrical Cable Assembly CX–2342/U, Handset H–33/PT; MIL spec #N11539; Motorola, Inc. part #201V1228.	Provides two-way mobile communications in installations supplying a 12-volt d-c source of power.	
	RADIO SET AN/VRC–6: oper freq 25 to 50 mc; F3 type emission; 30 w output; oper power requirements 24 v d-c at 10 amp; moisture and fungi resistant; c/o Radio Receiver R–257/U, Radio Transmitter T–208/U, Dynamotor-Power Supply DY–98/G, Power Supply PP–867/U, Electrical Equipment Cabinet CY–938/VRC, Electrical Equipment Rack MT–1236/VRC, Radio Set Control C–847/U, Special Purpose Electrical Cable Assembly CX–2341/U, Electrical Power Cable Assembly CX–2343/U, Handset H–33/PT; MIL spec #N–11539; Motorola, Inc. part #201V1230.	Provides two-way mobile communication in installations supplying a 24-volt d-c source of power.	2S4502–6
	DYNAMOTOR-POWER SUPPLY DY–93/G: d-c output; 380 v, .180 amp, unregulated; 225 v, .070 amp, unregulated; 225 v, .045 amp, unregulated; 1.3 v, 1 amp, unregulated; 1.3 v, 1 amp, regulated; −25 v, .005 amp, unregulated; d-c input; 12 v, 21 amp; 14½″ lg x 7″ wd x 8⅝″ h o/a; filter incl; rack mtd; tropicalized; Motorola, Inc. part #201V1197.	12-volt power supply for transmitter.	

1. Identification Table of Parts for Radio Set AN/VRC-6(*)—(contd)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	DYNAMOTOR-POWER SUPPLY DY–98/G: vibrator type synchronous, d-c output; 380 v, .180 amp, unregulated; 225 v, .070 amp, unregulated; 225 v, .045 amp, unregulated; 1.3 v, 1 amp, regulated; 1.3 v, .200 amp, regulated; −25 v, .005 amp, unregulated; a-c output; 6 v, 2 amp, unregulated; d-c input; 24 v, 10 amp; 14½″ lg x 7″ wd x 8⅝″ h o/a filter incl; rack mtd; tropicalized; Motorola, Inc. part #201V1076.	24-volt transmitter power supply.	
	DYNAMOTOR-POWER SUPPLY DY–100/U: d-c output; 380 v, .180 amp, unregulated; 225 v, .070 amp, unregulated; 225 v, .045 amp; unregulated; 6 v, 2 amp, unregulated; 6 v, 3.6 amp, unregulated; 1.3 v, .200 amp, regulated; 1.3 v, 1 amp, regulated; −25 v, .005 amp, unregulated; d-c input; 6 v, 40 amp; 14½″ lg x 7″ wd x 8⅝″ h o/a; w/filter; rack mtd; tropicalized; Motorola, Inc. part #201V1081.	6-volt transmitter power supply.	3H1535–100
	POWER SUPPLY PP–867/U: vibrator type, synchronous; output data, d-c; 155 v, .015 amp; 150 v, .005 amp; 140 v, .060 amp; 1.4 v, 1.25 amp, regulated; −40 v, .5 ma; a-c; 6 v, .45 amp; input, d-c, 24 v, 1.1 amp; 7″ lg x 6¼″ wd x 5″ o/a filter incl; four 8-32 tapped mtg holes on 4¼″ x 5⁹⁄₁₆″ mtg/c; tropicalized; Motorola, Inc. part #201V1048; Military spec #N–11539 Amendment No. 2.	24-volt d-c power supply for receiver.	3H4497–867
	POWER SUPPLY PP–869/U: vibrator type; synchronous; d-c output data 155 v, .015 amp; 150 v, .005 amp; 140 v, .060 amp; 1.4 v, 1.25 amp, regulated; −40 v, .0005 amp; input data, 6 v d-c 3.7 amp; 7″ lg x 6¼″ wd x 5″ h o/a; filter incl; four 8-32 tapped mtg holes on 4¼″ 5⁹⁄₁₆″ mtg/c; tropicalized; Motorola, Inc. part #201V1045.	6-volt d-c power supply for receiver.	3H4497–869
	RADIO TRANSMITTER T–208/U: 25 to 50 mc; crystal controlled; 50 w; d-c power requirements 380 v, .180 amp; 225 v, .35 amp; 200 v, .045 amp; 90 v, .004 amp; 24 v, .25 amp; 6.3 v, 2 amp; 6 v, .9 amp; 2 v, .01 amp; 1.3 v, .1 amp; 1.25 v, .2 amp; −22 v, .005 amp; 14½″ lg x 4½″ wd x 8⁹⁄₁₆″ h; Motorola, Inc. part #201V1187.	Radio transmitter for Radio Set AN/VRC–6(*).	
	RADIO RECEIVER R–257/U: f-m reception; 25-50 mc range in one band; d-c power requirements 155 v, .015 amp; 150 v, .005 amp; 140 v, .060 amp; 24 v, .25 amp; 6 v, .45 amp; 1.4 v, 1.2 amp; −40 v, .5 ma; 14½″ lg x 5¾″ wd x 8½″ h; 22 electron tubes; superheterodyne circuit; c/o 5 plug-in units; R-F AMPL, 25-50 MC plug-in unit; Motorola, Inc. part #201V1171; 1ST I-F 7.8 MC plug-in unit, Motorola, Inc. part #201V1065; LOCAL OSC 25-50 MC plug-in unit, Motorola, Inc. part #201V1126; 2ND I-F AND DISCR plug-in unit, Motorola, Inc. part #201V1068; AUDIO AND SQUELCH plug-in unit, Motorola, Inc. part #201V1096; Receiver Base, Motorola, Inc. part #201V1066; Motorola, Inc. part #201V1180; for communications.	Radio receiver for Radio Set AN/VRC–6(*).	2C4180–257

2. Identification Table of Parts for Electrical Equipment Cabinet CY-938/VRC

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	CABINET, electrical equipment: aluminum; o/a dimen 18 15/16″ lg x 10 3/4″ wd x 17 1/16″ h; 3 sets of mtg rails; 3 female connectors; MIL spec #N–11539; Motorola, Inc. part #201V1138.	Cabinets for Radio Sets AN/VRC–6, –6X, and –6Y.	6F290–938
E801	BUS-BAR: brass; rectangular; solid; o/a cross sect. dimen .437″ wd x .064″ h x 1.75″ lg o/a; 2 mtg holes; Motorola, Inc. part #264B1100.	Shorting strip for terminal board TB806.	
H820 thru H831	COLLAR, spacing: brass; shoulder shape; 0.159″ lg x 0.375″ dia o/a; Motorola, Inc. part #243B1070.	Spacing collar for mounting of receptacle.	
P801	CONNECTOR, PLUG: 1 round male cont; straight; o/a dimen 31/32″ lg excluding term. x 27/64″ dia; 52 ohms nom impedance; cylindrical; Navy spec type UG88/U; Motorola, Inc. part #928R143.	Antenna connector.	2Z7390–88
J801	CONNECTOR, receptacle: 32 round female cont; pol; straight; o/a dimen 3 3/8″ lg x 1 11/16″ wd x 63/64″ d; 28 cont rated at 10 amp, 2 cont rated at 40 amp; 2 radio freq cont 53.5 ohms nom impedance; rectangular; four .144″ dia mtg holes; Cannon Electric Co. part #DPD–32C2–335 type L; Motorola, Inc. part #209T1008.	Interconnects transmitter with cabinet.	
J802	CONNECTOR, receptacle: 30 round female cont; straight; o/a dimen excl term. 3 3/8″ lg x 1 11/16″ wd x 63/64″ d; 28 cont rated at 10 amp, 2 cont rated at 40 amp; rectangular; four .144″ dia mtg holes; Cannon Electric Co. part #DPD–30–33S type L; Motorola, Inc. part #209T1014.	Interconnects transmitter power supply with cabinet.	2Z3082–121
J803	CONNECTOR, receptacle: 31 round female cont; pol; straight; o/a dimen 3 3/8″ lg x 1 11/16″ wd x 63/64″ d; 28 cont rated at 10 amp, 2 cont rated at 40 amp; 1 radio freq cont 53.5 ohms nom impedance; rectangular; four .144″ dia mtg holes; Cannon Electric Co. part #DPD–31C1–33S type L; Motorola, Inc. part #209T1007.	Interconnects receiver with cabinet.	2Z3082–120
J804	CONNECTOR, receptacle: 2 round female cont; straight; o/a dimen 1 13/32″ lg excluding term.; 11/16″ across flats; radio freq connector 52 ohms nom impedance; cylindrical; mts in 1/2″ dia hole; Navy spec type UG492/U; Motorola, Inc. part #928R148.	R-f feedthrough receptacle.	2Z3056–21
A 801, A 802	COVER, radio set: aluminum; iridite finish; o/a dimen 18.9″ lg x 9.968″ wd x .875″ h; mts by 3 catches on each side; Motorola, Inc. part #215C1085.	Protective cover for cabinet.	
O 805 thru O 816	FASTENER, latch: spring-lock type; SS; 2 1/8″ lg x 1 3/8″ wd x 9/16″ d; two 9/64″ dia mtg holes; green; Corbin Cabinet Lock Div. part #15824; Motorola, Inc. part #225T1014.	Secures covers to cabinet.	6Z3810–115
F801	FUSE, cartridge: 125 v at 50 amp; time delay 200% for 60 sec, 500% for 7 sec; lug term.; inclosed fibre body; 1 time; non-indicating; o/a dimen 1 3/4″ lg x 13/16″ barrel dia; thermal cutout; Bussman Mfg. Co. part #HSK–50; Motorola, Inc. part #265T1014.	Primary power source fuse.	3Z2650.13

2. Identification Table of Parts for Electrical Equipment Cabinet CY-938/VRC—(contd)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
U803, U804	GASKET: silicone rubber; tubular; 54¾″ lg x ⅜″ OD x 3/16″ ID; Stalwart Rubber Co. part #G–E81223; Motorola, Inc. part #232C1103.	Provides weatherproof seal for cabinet.	
U805	GASKET: rubber; cylindrical grommet shape; 1⅝″ dia x ¾″ lg o/a; Motorola, Inc. part #232B1113.	Waterproof seal for cable thru panel.	
A 803	PLATE, aperture: steel; oval; o/a dimen 2.562″ lg x 1.687″ wd x .281″ h; two .213″ dia mtg holes; Motorola, Inc. part #264B1079.	Cable gland aperture plate.	2Z7090.342
A 804	PLATE, aperture: steel; 2.875″ lg x 2″ wd x .281″ thk; two .213″ dia mtg holes; Motorola, Inc. part #264B1097.	Cable outlet.	2Z7090.341
H809 thru H811	PLATE, lock: steel; cad plt; rectangular shape; 2″ lg x 15/16″ wd x ⅛″ thk o/a; Alden Products part #11019–5–3; Motorola, Inc. part #264B1301.	Lock-in plate for receiver mounting.	
R801	RESISTOR, fixed: comp; 2,200 ohms ±10%; ½ w; JAN type RC20BF222K; Motorola, Inc. part #906R466.	Part of audio attenuator network.	3RC20BF222K
R802	RESISTOR, fixed: comp; 680 ohms ±10%; ½ w; JAN type RC20BF681K; Motorola, Inc. part #906R445.	Part of audio attenuator network.	3RC20BF681K
H812 thru H817	SPRING: helical extension type; steel; o/a dimen 5.437″ lg x .382″ dia; 78 right-hand turns; Motorola, Inc. part #241B1015.	Shock absorber for plug-in chassis.	2Z8878–107
U801	STUFFING, tube: straight term. type; o/a dimen .75″ lg x 1.18″ dia; .83″ bore dia; black neoprene; Motorola, Inc. part #232B1003.	Waterproofs cable entrance.	2Z4866–573
U802	STUFFING, tube: straight term. type; o/a dimen .75″ lg x 1.392″ dia; 1.1″ bore dia; black Buna rubber; Motorola, Inc. part #232B1006.	Waterproofs cable entrance.	6Z4554–3
TB801, TB802, TB804, TB805	TERMINAL BOARD: phenolic; incl 10 dbl screw type term.; barrier type; o/a dimen 4⅜″ lg x 1 3/64″ wd x 13/32″ thk; Howard B. Jones Co. part #10–140–3/4WA; Motorola, Inc. part #231K1072.	Junction terminal strip.	3Z770–10.35
TB803	TERMINAL BOARD: molded plastic; incl 6 dbl screw type term.; barrier type; o/a dimen 2⅞″ lg x 1 3/64″ wd x 13/32″ thk; Cinch Mfg. Corp. part #6–140–3/4WA; Motorola, Inc. part #231K1043.	Terminal board.	3Z770–6.74
TB806	TERMINAL BOARD: molded plastic; incl 4 screw type term.; o/a dimen 3 3/16″ lg x 2″ wd x 11/16″ thk; Motorola, Inc. part #246B1039.	Power input terminal block.	3Z770–4.174
TB807	TERMINAL BOARD: PBE–P phenolic; incl 3 turret type term.; o/a dimen 1¼″ lg x ⅞″ wd x 35/64″ h; Motorola, Inc. part #231B1052.	Mounts resistors R801 and R802.	3Z770–3/103

3. Identification Table of Parts for Special Purpose Electrical Cable Assembly CX-2341/U

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
W3501	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 4 cond #16 AWG copper stranded, 16 cond #20 AWG copper stranded; 4 cond rated at 600 vdcw, 16 cond rated at 300 vdcw; 35 1/8″ lg o/a; 21 lug term. located on one end; 20 tube base pin term. located on other end; Motorola, Inc. part #230D1008.	Used for connecting control unit to cabinet.	3E5999–8.34
E3501 thru E3520	TIP, phone: round pin type; brass; accom #16 AWG wire; o/a dimen 5/8″ lg x 5/32″ dia; plug-in mtg; Cinch Mfg. Co. part #10E4715P50; Motorola, Inc. part #22A1006.	Male termination for control cable.	2Z9494A–9
E3521 thru E3541	TERMINAL, lug: flanged spade end type; copper alloy; accom #14 AWG wire; o/a dimen .67″ lg x .25″ wd x .187″ thk; crimped wire connection; Thomas and Belts Co. catalogue #B19; Motorola, Inc. part #229T1102.	Cable terminal lug.	

4. Identification Table of Parts for Special Purpose Electrical Cable Assembly CX-2342/U

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
W3503	CABLE ASSEMBLY, power: electrical; Type Sig C Cable CO–02 HGF (2/4) 1100; 2 cond stranded, #4 AWG; Buna ins; jute fillers; rubberized compound filled tape; Buna jacket; 600 v max rated working voltage; 16′ lg o/a; 2 solder lug term. fittings on first end; Motorola, Inc. part #230B1018.	Power cable assembly for AN/VRC–6Y or AN/VRC–6X.	3E5999–8.35
E3542, E3543	TERMINAL, lug: round tongue end type; copper; accom #4 AWG wire; o/a dimen 1 3/8″ lg x 1/2″ wd x 3/8″ h; one 9/32″ mtg hole; Motorola, Inc. part #929R101.	Cable terminal lug.	3Z12073–68.1

5. Identification Table of Parts for Electrical Power Cable Assembly CX-2343/U

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
W3551	CABLE ASSEMBLY, power: electrical; type SIG C CO–212; 2 cond stranded, one #8 AWG, 1 shield; Buna ins; cotton wrap; copper shield; cotton wrap; chloroprene jacket; 3,000 v dielectric test; 12′ 3″ lg o/a; 2 solder lug term. fittings on first end; 43 strands #24 AWG for 1 cond, 49 strands #25 AWG for second cond; Motorola, Inc. part #230B1019.	Power cable assembly for AN/VRC–6.	34002.76
E3551, E3552	TERMINAL, lug: round tongue end type; copper; accom #8 AWG wire; o/a dimen 1 1/4″ lg x 11/32″ wd x 5/16″ h; 1 13/64″ mtg hole; Motorola, Inc. part #929R102.	Cable terminal lug.	3Z12073–68.2

6. Identification Table of Parts for Radio Set Control C-847/U

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	CONTROL, Radio Set C–847/U: manual type; c/o 1 VOLUME control, 1 SQUELCH control, 1 FREQ switch, 1 SPKR switch, 1 red and 1 green indicator; oper requirements, 115 or 230 v a-c 60 cyc; 6, 12, or 24 v d-c; zinc base; olive drab finish; o/a dimen 9 3/8″ lg x 5 13/16″ wd x 3 9/16″ h; mts by two 3/4″ lg x 3/8″ wd slots on case; waterproof; MIL spec #N–11539; Motorola, Inc. part #201V1099.	Control for Radio Set AN/VRC–6(*).	2C684–847
J1501	CONNECTOR, receptacle: 10 round button cont; straight type; o/a dimen 1 1/16″ lg x 1 9/32″ dia; cylindrical; molded amphenol blue insert; American Phenolic Corp. part #164–7; Motorola, Inc. part #228T1003.	Microphone input jack.	2Z7250–97
U1501	GASKET: waterproof seal; neoprene; single hole; cylindrical; .687″ lg x 1.28″ OD x .83″ ID; Motorola, Inc. part #232B1003.	Provides weatherproofing for cable through cabinet.	2Z4866.573
U1502	GASKET: neoprene; 9 holes; rectangular; o/a dimen 7 1/2″ lg x 5 3/16″ wd x 1/16″ thk; Motorola, Inc. part #232C1004.	Provides weatherproofing between cabinet and cover.	2Z4866.572
U1503	GASKET: neoprene; 5 holes; square; o/a dimen 3 7/8″ lg x 3 7/8″ wd x 1/16″ thk; 3 3/8″ dia ctr hole; Motorola, Inc. part #232B1102.	Provides weatherproofing for speaker.	2Z4866.571
H1501, H1502	KNOB: bar type; zinc alloy; green; accom round double flatted shaft .25″ dia x .188″ across flats; .359″ d shaft hole; o/a dimen 1 15/16″ lg x 7/8″ wd x 15/32″ h; Motorola, Inc. part #236B1003.	Control knob for speaker switch and frequency selector switch.	2Z5822–809
H1503, H1504	KNOB: round w/bar; zinc alloy; green; accom round double flatted shaft .25″ dia x .19″ across flats; 3/16″ d shaft hole; o/a dimen 1 3/16″ dia x 7/8″ h; Motorola, Inc. part #236C1001.	Control knobs for squelch and volume control switches.	2Z5822–808
I 1501, I 1502	LAMP, incandescent: 6-8 v, .15 amp, 1.2 w; miniature bayonet base; bulb T–3–1/4 clear; single C–6 tungsten fil; o/a dimen 1 3/16″ lg; General Electric Co. part #47; Motorola, Inc. part #965R106.	Indicator lamp.	2Z5952
I 1505	LENS, indicator light: 1/2″ dia; green; hemispherical glass type; o/a dimen 7/16″ lg x 5/8″ dia; bezel mtd; Dial Light Co. part #81–122; Motorola, Inc. part #261T1101.	Covers indicator light I 1504.	2Z6125–217
I 1506	LENS, indicator light: 1/2″ dia; red; hemispherical glass type; o/a dimen 7/16″ lg x 5/8″ dia; bezel mtd; Dial Light Co. part #81–121; Motorola, Inc. part #261T1102.	Covers indicator light I 1503.	2Z6125–216
I 1503	LIGHT, indicator: 1/2″ dia red lens; accom T–3–1/4 bulb; miniature bayonet base; 6 v, .25 amp; inclosed aluminum shell; o/a dimen 2 1/4″ lg x 13/16″ dia; accom up to 5/16″ thk panel; 2 solder lug term. located at end of body; waterproof; Dial Light Co. part #81410–121; Motorola, Inc. part #209T1013.	Dial light assembly.	2Z5991–332

6. Identification Table of Parts for Radio Set Control C-847/U—(contd)

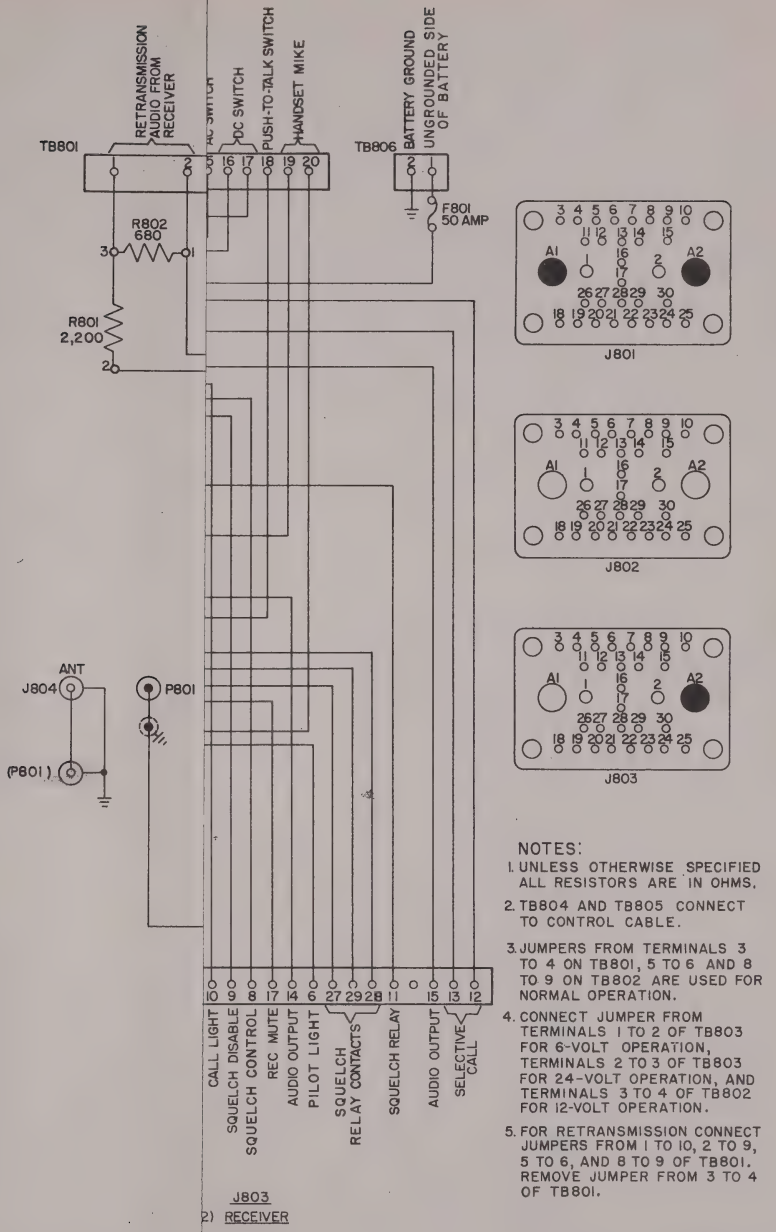
Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
I 1504	LIGHT, indicator: ½″ dia green lens; accom T–3–¼ bulb; miniature bayonet base; 6 v; .25 amp; incl aluminum shell; o/a dimen 2¼″ lg x 13/16″ dia; accom up to 5/16″ thk panel; 2 solder lug term. located at end of body; waterproof; Dial Light Co. part #81410–122; Motorola, Inc. part #209T1012.	Dial light assembly.	2Z5991–333
LS1501	LOUDSPEAKER, magnetic: pm field; 8-ohm voice coil; 3-w peak input; diaphragm type; o/a dimen 4 1/16″ h x 4 1/16″ wd x 2½″ d; waterproof; blast resistant; University Loudspeakers, Inc. part #C4BF; Motorola, Inc. part #250C1003.	Loudspeaker for control unit.	6C43–62
A 1501	PLATE, aperture: steel; 2 9/16″ lg x 1 11/16″ wd x 9/32″ h; two .213″ dia holes; Motorola, Inc. part #264B1079.	Cable outlet.	2Z7090.342
A 1502	PLATE, cover: zinc alloy; painted green on side; rectangular; o/a dimen 7½″ lg x 5 3/16″ wd x 3/16″ thk; 8 threaded mtg holes; Motorola, Inc. part #215D1067.	Protective cover for Radio Set Control.	
R1501	RESISTOR, fixed: comp; 33 ohms ±10%; ½ w; JAN type RC20BF330K; Motorola, Inc. part #906R389.	Audio gain attenuator.	3RC20BF330K
R1502, R1503, R1504	RESISTOR, fixed: comp; 10 ohms ±10%; ½ w; JAN type RC20BF100K; Motorola, Inc. part #906R368.	Audio gain attenuator.	3RC20BF100K
R1505	RESISTOR, fixed: comp; 68 ohms ±10%; ½ w; JAN type RC20BF680K; Motorola, Inc. part #906R403.	Audio gain attenuator.	3RC20BF680K
R1506, R1507, R1508, R1510	RESISTOR, fixed: comp; 10 ohms ±10%; 1 w; JAN type RC30BF100K; Motorola, Inc. part #906R634.	R1506: Audio gain attenuator. R1507 and R1508: Current-limiting resistors for I 1501 and I 1502. R1510: Replaces speaker when not in use.	3RC30BF100K
R1509	RESISTOR, variable: 1 sec.; 500,000 ohms ±10%; ¼ w; Motorola, Inc. part #218B1003.	Manual squelch control.	3Z7498–50.211
S1501	SWITCH, rotary: 1 sect.; 2 poles, 5 position; silver alloy cont; phenolic body; o/a dimen 1 11/32″ lg x 1¼″ dia; solder lug term.; shaft 7/8″ lg w/double flats; rated 5 amp at 125 VAC; Oak Mfg. Co. part #48954–FIAC; Motorola, Inc. part #240B1006.	Stepped VOLUME control and a-c switch.	3Z9825–23.13
S1502	SWITCH, rotary: 1 sect.; 6 poles, 2 positions; 2 v a-c, 60 cyc, .25 amp; silver alloy cont; o/a dimen 7/8″ lg x 1¼″ dia; shaft ¾″ lg w/flat shaft; Oak Mfg. Co. part #48277–F–1; Motorola, Inc. part #240B1007.	Speaker on-off switch.	3Z9825–23.14
S1503	SWITCH, rotary: 1 sec. DPDT; silver alloy cont; phenolic body; dimen excluding shaft 7/8″ lg x 1¼″ dia; shaft ¼″ lg w/double flats; solder lug term.; Oak Mfg. Co. part #48952–F1; Motorola, Inc. part #240B1005.	Frequency selector switch.	3Z9825–23.12

6. Identification Table of Parts for Radio Set Control C-847/U—(contd)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
TB1501	TERMINAL BOARD: PBE–P phenolic; 10 solder lug term.; o/a dimen 4″ lg x $1\frac{5}{16}$″ wd x $\frac{5}{32}$″ thk; Motorola, Inc. part #231B1037.	Terminal board for control unit.	3Z770–10.101
TB1502	TERMINAL BOARD: PBE–P phenolic; 10 solder receptacle term.; 1 solder lug term. o/a dimen 4″ lg x $1\frac{15}{16}$″ wd x $\frac{9}{16}$″ h; two .136″ dia mtg holes; Motorola, Inc. part #231B1039.	Terminal board for control unit.	3Z770–11.37

7. Identification Table of Parts for Electrical Equipment Rack MT-1236/VRC

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	MOUNTING: steel; semigloss enamel; holds case by 5 bolts on each end; 4 shock mounts located between cradle and supporting brackets; Motorola, Inc. part #201V1140.	Mounting for Electrical Equipment Cabinet CY–938/U.	2Z7383–1236
O 801 thru O 804	MOUNTING: steel and rubber; green enamel finish; four .141″ mtg holes; 4 shock mounts located between cradle and cabinet bracket; Motorola, Inc. part #275A1002.	Shock mount for Electrical Equipment Rack MT–1236/VRC.	2Z6820.592



NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE IN OHMS.
2. TB804 AND TB805 CONNECT TO CONTROL CABLE.
3. JUMPERS FROM TERMINALS 3 TO 4 ON TB801, 5 TO 6 AND 8 TO 9 ON TB802 ARE USED FOR NORMAL OPERATION.
4. CONNECT JUMPER FROM TERMINALS 1 TO 2 OF TB803 FOR 6-VOLT OPERATION, TERMINALS 2 TO 3 OF TB803 FOR 24-VOLT OPERATION, AND TERMINALS 3 TO 4 OF TB802 FOR 12-VOLT OPERATION.
5. FOR RETRANSMISSION CONNECT JUMPERS FROM 1 TO 10, 2 TO 9, 5 TO 6, AND 8 TO 9 OF TB801. REMOVE JUMPER FROM 3 TO 4 OF TB801.

TM 283-45

49. Electrical Equipment Cabinet CY-938/VRC, schematic diagram.

6. Identification Table of Parts for Radio Set Control C-847/U—(contd)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
TB1501	TERMINAL BOARD: PBE–P phenolic; 10 solder lug term.; o/a dimen 4″ lg x 1 5/16″ wd x 5/32″ thk; Motorola, Inc. part #231B1037.	Terminal board for control unit.	3Z770–10.101
TB1502	TERMINAL BOARD: PBE–P phenolic; 10 solder receptacle term.; 1 solder lug term. o/a dimen 4″ lg x 1 15/16″ wd x 9/16″ h; two .136″ dia mtg holes; Motorola, Inc. part #231B1039.	Terminal board for control unit.	3Z770–11.37

7. Identification Table of Parts for Electrical Equipment Rack MT-1236/VRC

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	MOUNTING: steel; semigloss enamel; holds case by 5 bolts on each end; 4 shock mounts located between cradle and supporting brackets; Motorola, Inc. part #201V1140.	Mounting for Electrical Equipment Cabinet CY–938/U.	2Z7383–1236
O 801 thru O 804	MOUNTING: steel and rubber; green enamel finish; four .141″ mtg holes; 4 shock mounts located between cradle and cabinet bracket; Motorola, Inc. part #275A1002.	Shock mount for Electrical Equipment Rack MT–1236/VRC.	2Z6820.592

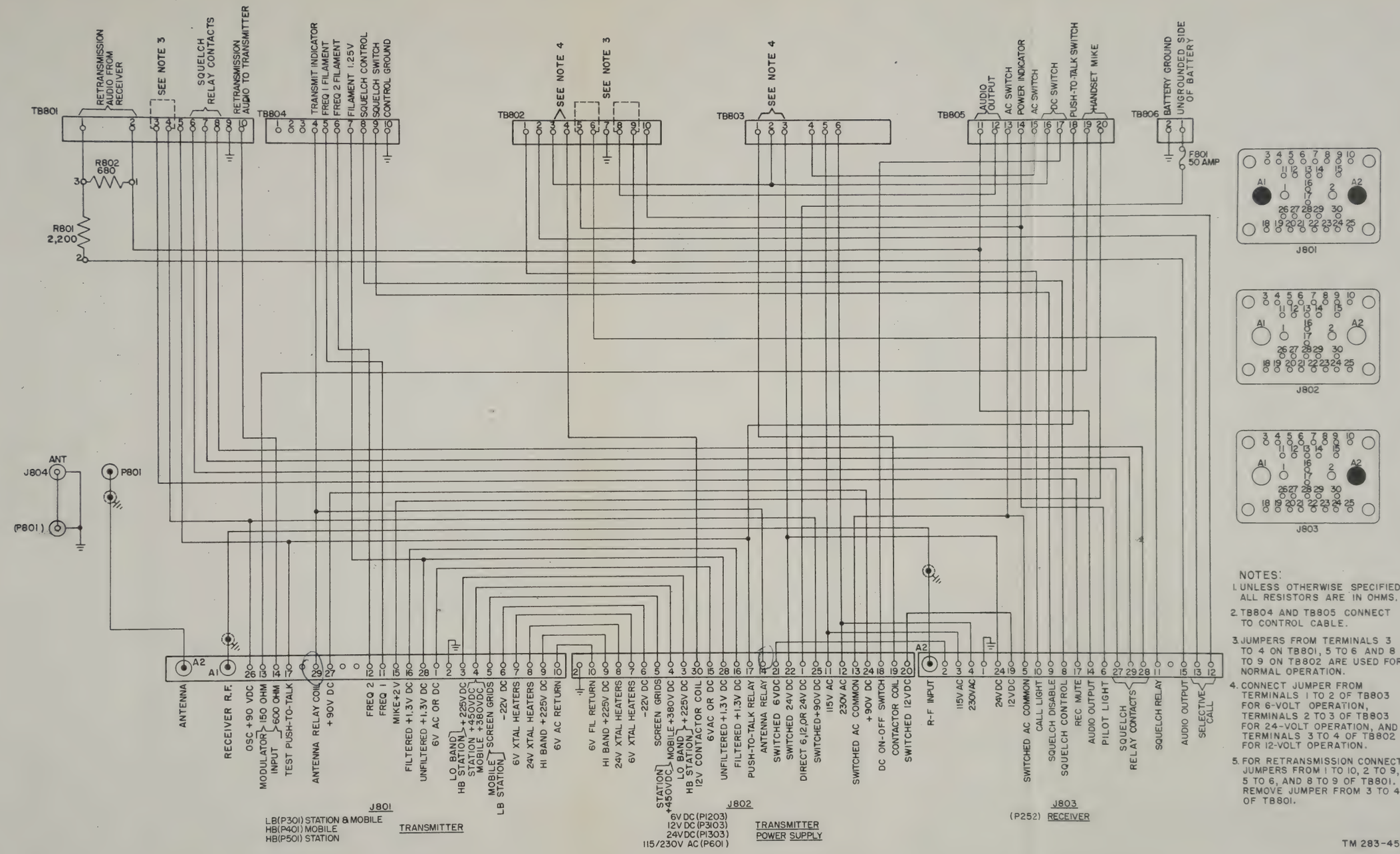


Figure 49. Electrical Equipment Cabinet CY-938/VRC, schematic diagram.

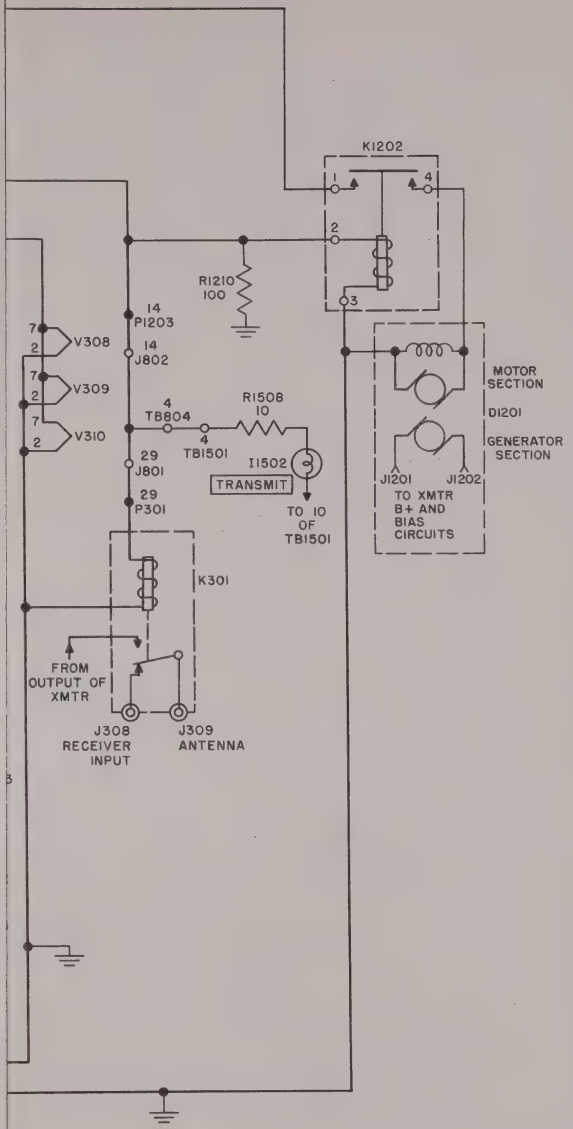
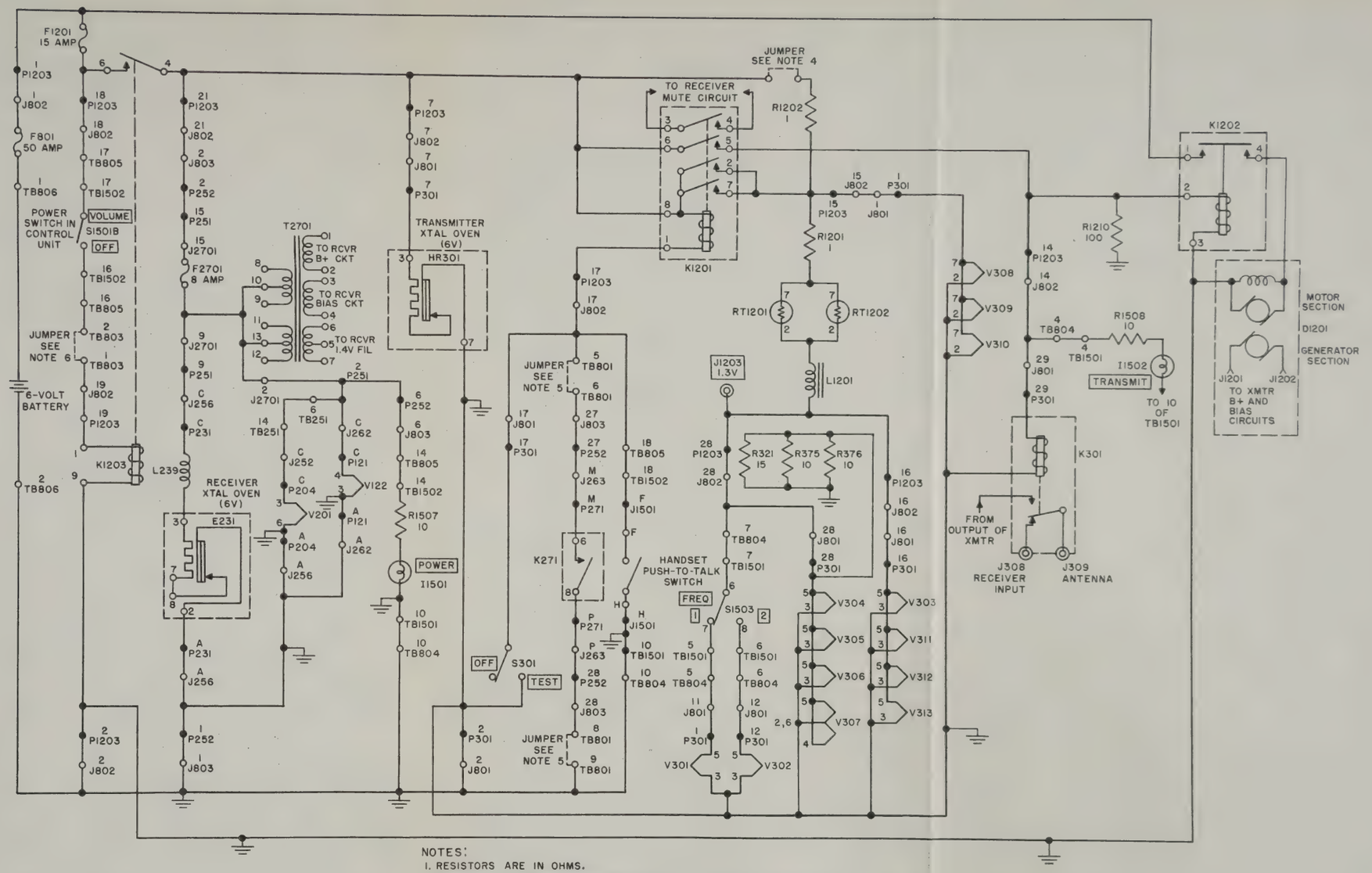


Figure 50. Radio Set AN/VRC-6Y, power and control circuits.



NOTES:

1. RESISTORS ARE IN OHMS.
2. TERMINAL AND SYMBOL NUMBERS ARE AS FOLLOWS:
   1 TO 300 RADIO RECEIVER R-257/U. 300 TO 400 RADIO TRANSMITTER T-208/U.
   800 TO 900 ELECTRICAL EQUIPMENT CABINET CY-938/VRC. 1200 TO 1300 DYNAMOTOR-POWER SUPPLY DY-100/U.
   1500 TO 1600 RADIO SET CONTROL C-847/U. 2700 TO 2800 POWER SUPPLY PP-869/U.
3. ALL RELAYS ARE SHOWN IN UNENERGIZED POSITION.
4. JUMPER IN DYNAMOTOR-POWER SUPPLY DY-100/U ALLOWS CONTINUOUS OPERATION OF XMTR FILAMENTS.
5. JUMPER USED TO ENERGIZE XMTR WITH RECEIVER SQUELCH RELAY DURING RETRANSMISSION.
6. JUMPER USED FOR 6-VOLT OPERATION ONLY.
7. ⏚ INDICATES INDIVIDUAL CHASSIS GROUND.

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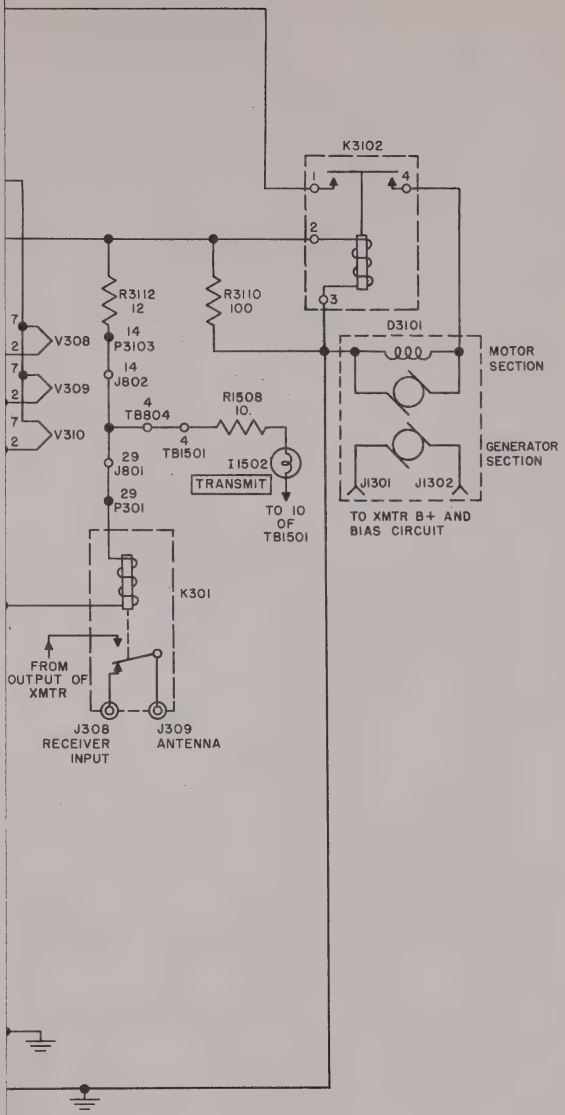
Figure 50. Radio Set AN/VRC-6Y, power and control circuits.

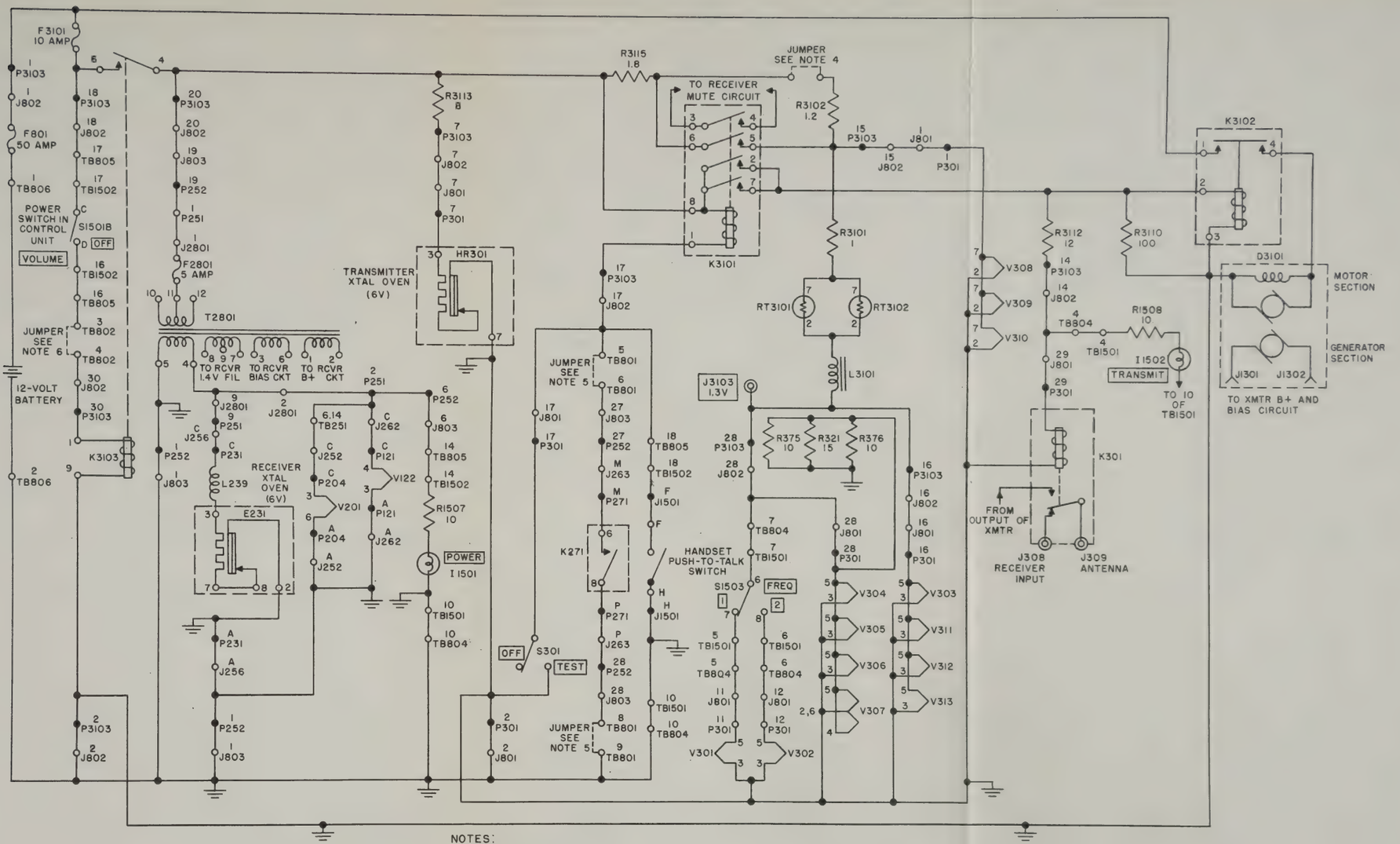


LY DY-93/G.

MENTS.
SION.

TM 283-52

Figure 51. Radio Set AN/VRC-6X, power and control circuits.

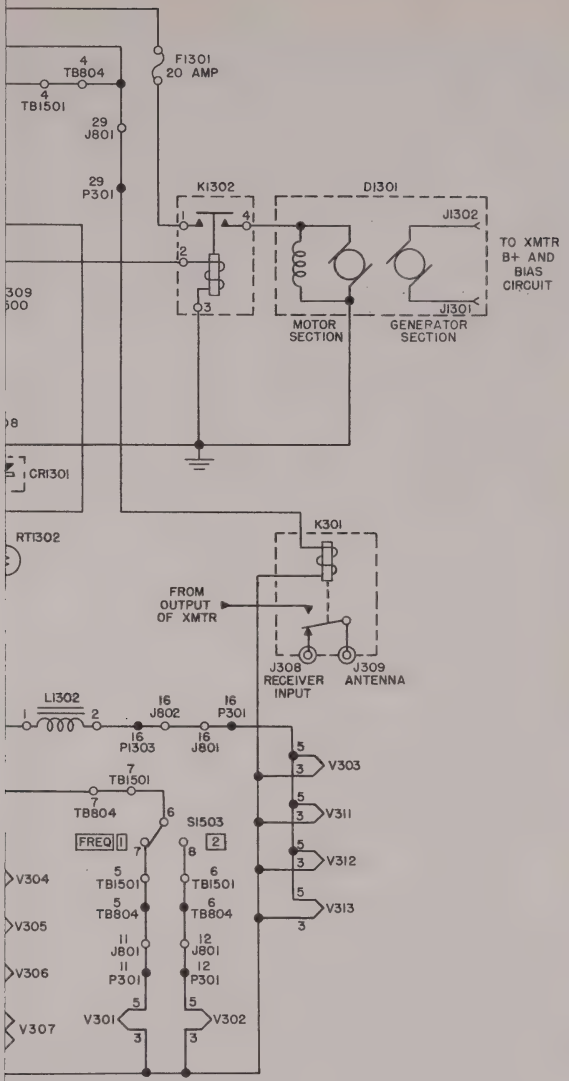


NOTES:

1. RESISTORS ARE IN OHMS.
2. TERMINAL AND SYMBOL NUMBERS ARE AS FOLLOWS:
   1 TO 300 RADIO RECEIVER R-257/U. 300 TO 400 RADIO TRANSMITTER T-208/U.
   800 TO 900 ELECTRICAL EQUIPMENT CABINET CY-938/VRC, 3100 TO 3200 DYNAMOTOR-POWER SUPPLY DY-93/G.
   1500 TO 1600 RADIO SET CONTROL C-847/U. 2800 TO 2900 POWER SUPPLY PP-868/U.
3. ALL RELAYS ARE SHOWN IN UNENERGIZED POSITION.
4. JUMPER IN DYNAMOTOR-POWER SUPPLY DY-93/G ALLOWS CONTINUOUS OPERATION OF XMTR FILAMENTS.
5. JUMPERS USED TO ENERGIZE XMTR WITH RECEIVER SQUELCH RELAY DURING RETRANSMISSION.
6. JUMPER USED FOR 12 VOLT OPERATION ONLY.
7. ⏚ INDICATES INDIVIDUAL CHASSIS GROUND.

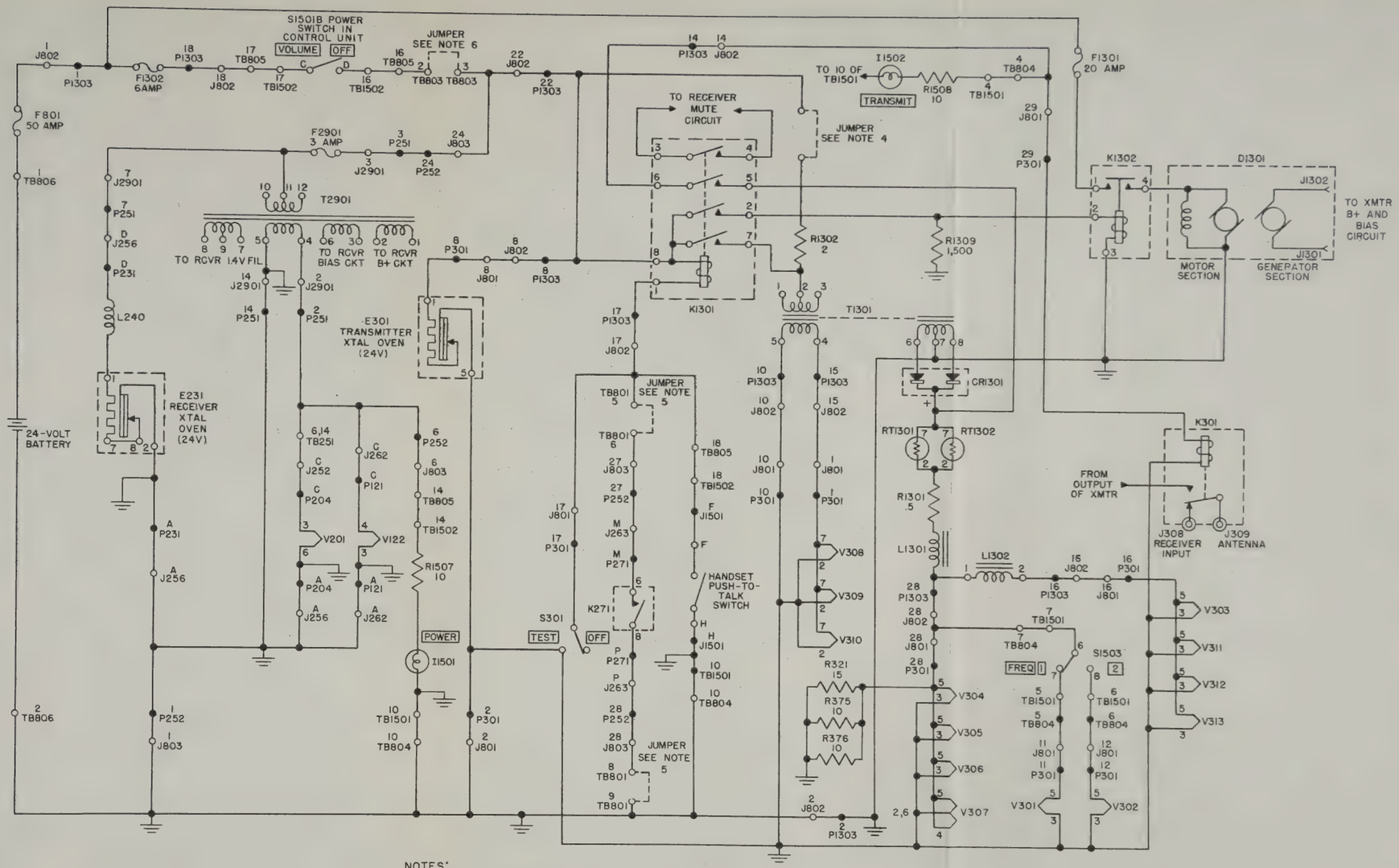
TM 283-52

Figure 51. Radio Set AN/VRC-6X, power and control circuits.



TM 283-53

Figure 52. Radio Set AN/VRC-6, power and control circuits.



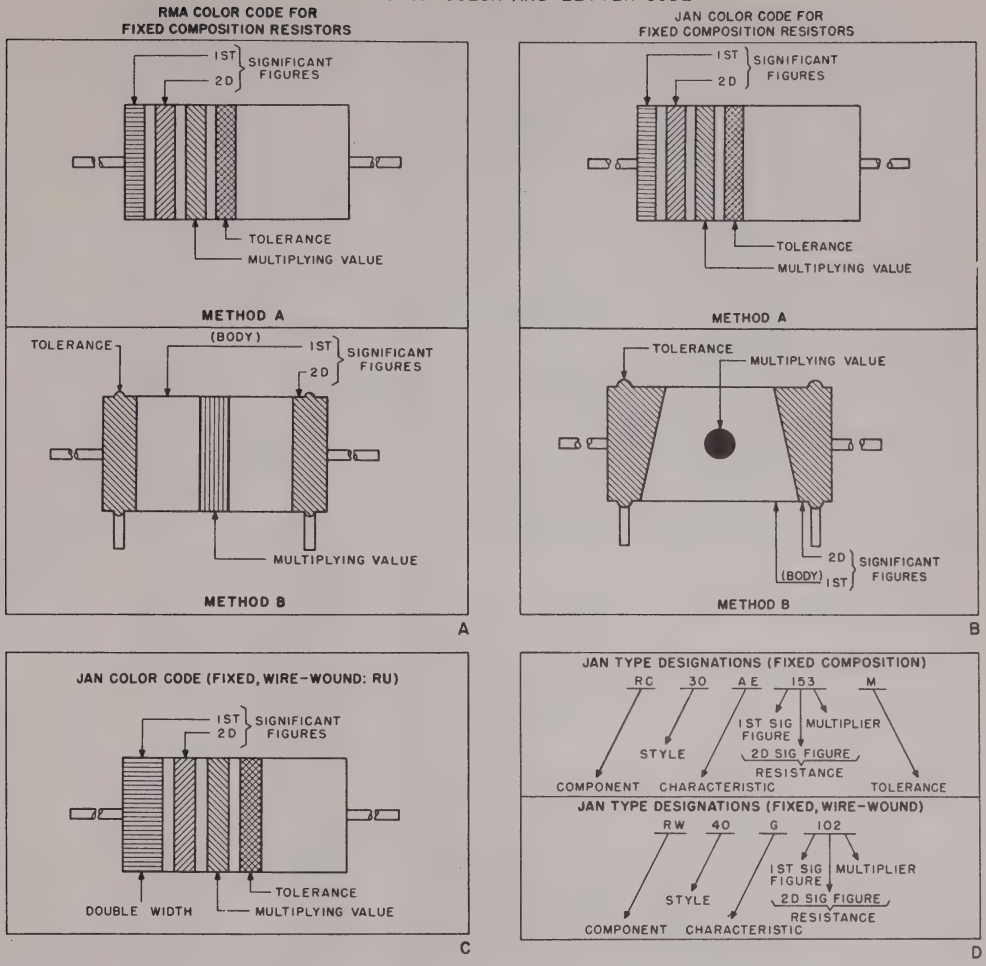
NOTES:

1. RESISTORS ARE IN OHMS.
2. TERMINAL AND SYMBOL NUMBERS ARE AS FOLLOWS:
   1 TO 300 RADIO RECEIVER R-257/U. 300 TO 400 RADIO TRANSMITTER T-208/U. 800 TO 900 ELECTRICAL EQUIPMENT CABINET CY-938/VRC. 1300 TO 1400 DYNAMOTOR-POWER SUPPLY DY-98/G. 1500 TO 1600 RADIO SET CONTROL C-847/U. 2900 TO 3000 POWER SUPPLY PP-867/U.
3. ALL RELAYS ARE SHOWN IN UNENERGIZED POSITION.
4. JUMPER IN DYNAMOTOR-POWER SUPPLY DY-98/G ALLOWS CONTINUOUS OPERATION OF XMTR FILAMENTS.
5. JUMPERS USED TO ENERGIZE XMTR WITH RECEIVER SQUELCH RELAY DURING RETRANSMISSION.
6. JUMPER USED FOR 24 VOLT OPERATION ONLY.
7. ⏚ INDICATES INDIVIDUAL CHASSIS GROUND.

TM 283-53

Figure 52. Radio Set AN/VRC-6, power and control circuits.

RESISTOR COLOR AND LETTER CODE



STANDARDS				
COLOR	SIGNIFICANT FIGURE	MULTIPLYING VALUE	TOLERANCE (%)	JAN LETTER TOLERANCE
BLACK	0	1	–	–
BROWN	1	10	± 1	F
RED	2	100	± 2	G
ORANGE	3	1,000	± 3	–
YELLOW	4	10,000	± 4	–
GREEN	5	100,000	± 5	–
BLUE	6	1,000,000	± 6	–
VIOLET	7	10,000,000	± 7	–
GRAY	8	100,000,000	± 8	–
WHITE	9	1,000,000,000	± 9	–
GOLD	–	0.1	± 5	J
SILVER	–	0.01	± 10	K
NO COLOR	–	–	± 20	M

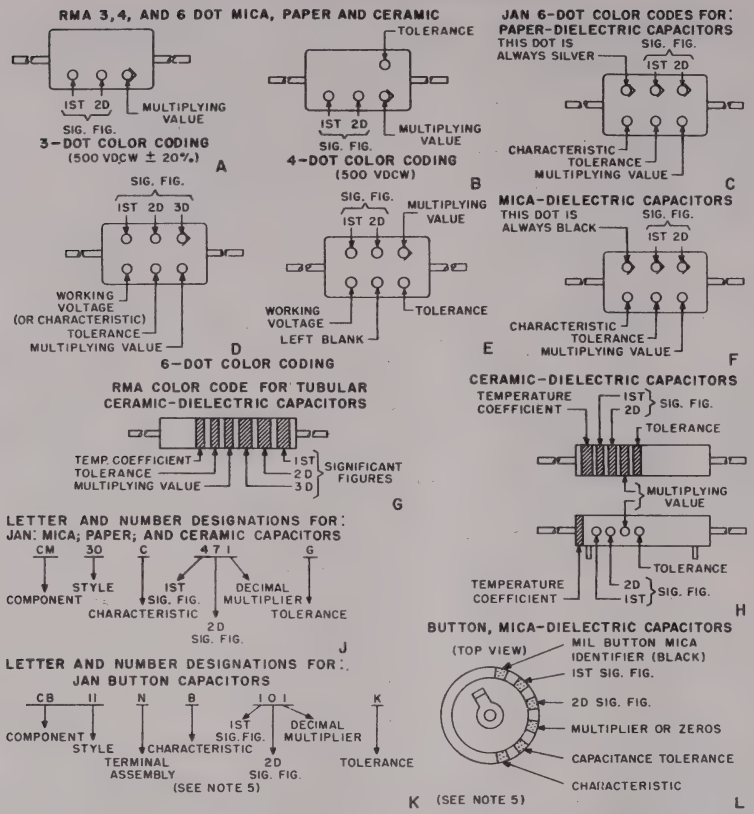
NOTES:

1. RESISTORS WITH AXIAL LEADS ARE INSULATED. RESISTORS WITH RADIAL LEADS ARE NON-INSULATED.
2. RMA: RADIO MANUFACTURERS ASSOCIATION.
3. JAN: JOINT ARMY-NAVY.
4. THESE COLOR AND NUMBER CODES GIVE ALL RESISTANCE VALUES IN OHMS.
5. RESISTIVE COMPONENTS USED FOR LETTER TOLERANCES ARE: RC, RN, AND RU.
6. WATTAGE FOR RW TYPES IS FOUND IN THE JAN SPECIFICATIONS UNDER CHARACTERISTICS.

TM RC

Figure 53. Resistor color codes.

CAPACITOR COLOR AND LETTER CODES



COLOR	- STANDARDS - SIG. FIG.	DECIMAL MULTIPLIER	% TOL.	VDCW	JAN MICA-CM LETTER TOL.	JAN MICA-CM CHARACTERISTIC	JAN PAPER-CP LETTER TOL.	JAN PAPER-CP CHARACTERISTIC	JAN CERAMIC-CC DEC. MULT.	JAN CERAMIC-CC CAP. TOL. FOR MORE THAN 10 UUF %	JAN CERAMIC-CC CAP. TOL. FOR MORE THAN 10 UUF LETTER DESIGNATION	JAN CERAMIC-CC CAP. TOL. FOR 10 UUF OR LESS UUF	JAN CERAMIC-CC CAP. TOL. FOR 10 UUF OR LESS LETTER DESIGNATION	JAN CERAMIC-CC CHARACTERISTIC
BLACK	0	1	±20	500	M	A	M	A	1	±20	M	±2.0	G	C
BROWN	1	10	± 1	100	-	B	-	E	10	± 1	F	-	-	H
RED	2	100	± 2	200	G	C	-	H	100	± 2	G	-	-	L
ORANGE	3	1,000	± 3	300	-	D	N*	J	1,000	-	-	-	-	P
YELLOW	4	10,000	± 4	400	-	E	-	P	-	-	-	-	-	R
GREEN	5	100,000	± 5	500	-	F	-	R	-	± 5	J	±0.5	D	S
BLUE	6	1,000,000	± 6	600	-	G	-	S	-	-	-	-	-	T
VIOLET	7	10,000,000	± 7	700	-	-	-	T	-	-	-	-	-	U
GRAY	8	100,000,000	± 8	800	-	-	-	-	0.01	-	-	±0.25	C	B
WHITE	9	1,000,000,000	± 9	900	-	-	-	-	0.1	± 10	K	±1.0	F	SL
GOLD	-	0.1	± 5	1,000	J	-	-	-	-	-	-	-	-	A
SILVER	-	0.01	±10	2,000	K	-	K	-	-	-	-	-	-	-
NO COLOR	-	-	±20	500	-	-	-	-	-	-	-	-	-	-

* THE TOLERANCE OF THIS CAPACITOR IS ±30%, NOT ±3%

NOTES

JAN: JOINT ARMY-NAVY
RMA: RADIO MANUFACTURERS ASSOCIATION

1. THESE COLOR AND LETTER CODES GIVE CAPACITANCES IN MICROMICROFARADS
2. THIS TABLE IS ADAPTED FOR JAN AND RMA COLOR AND JAN LETTER TYPE DESIGNATIONS
3. CERAMIC AND MICA CAPACITORS, BOTH JAN AND RMA, ARE GENERALLY 500 VDCW
4. BUTTON CAPACITORS ARE GENERALLY 300 VDCW
5. READ BUTTON CAPACITOR TOLERANCE UNDER CERAMICS OF MORE THAN 10 UUF
6. CHARACTERISTICS ARE AVAILABLE IN JAN CAPACITOR SPECIFICATION MANUALS
7. THE COMPONENTS USED ABOVE FOR JAN LETTER TYPE DESIGNATIONS ARE:
   CB MICA BUTTON: *CC* CERAMIC: *CM* MICA MOULDED: *CN* PAPER MOULDED

TM CC

Figure 54. Capacitor color codes.

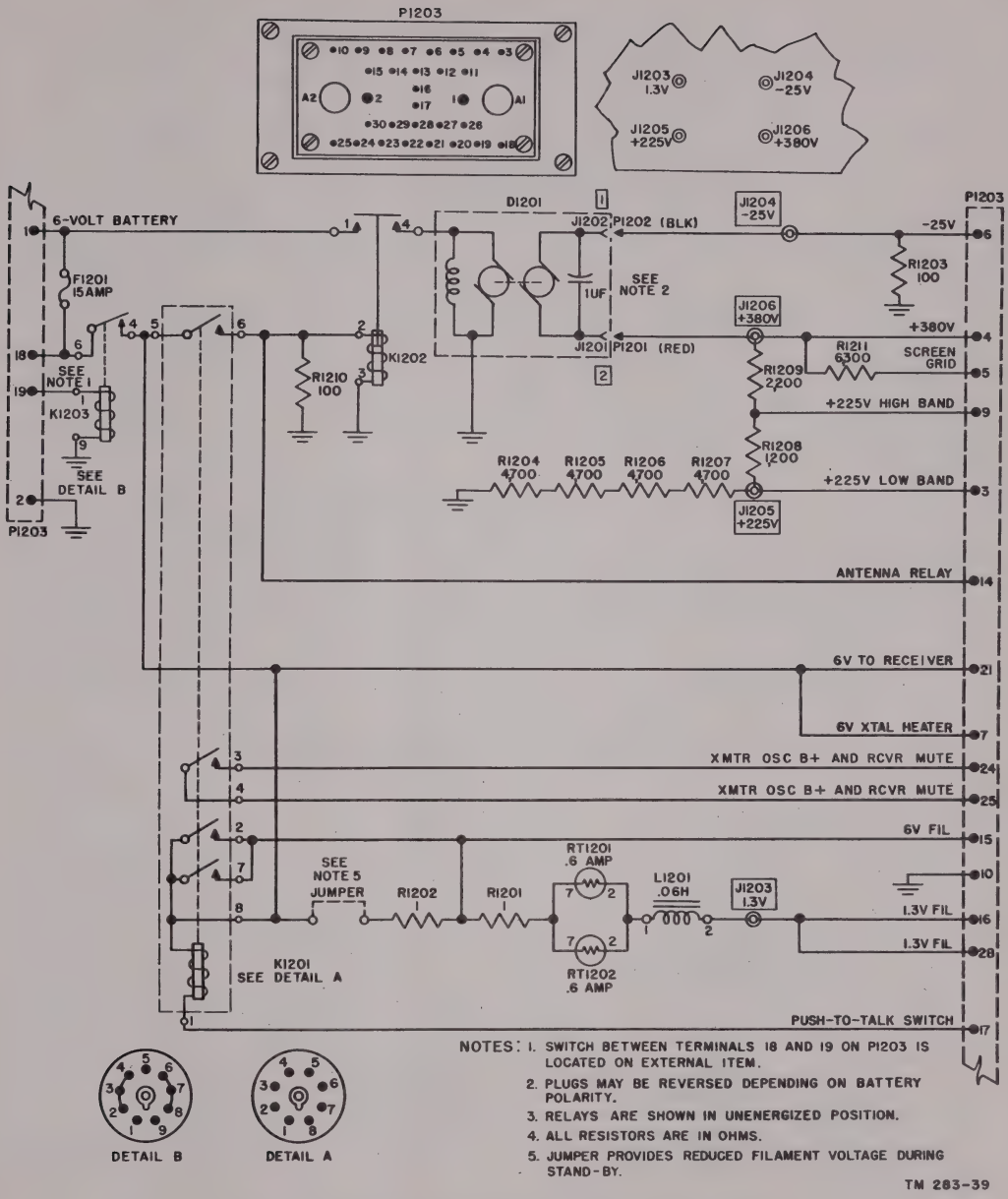
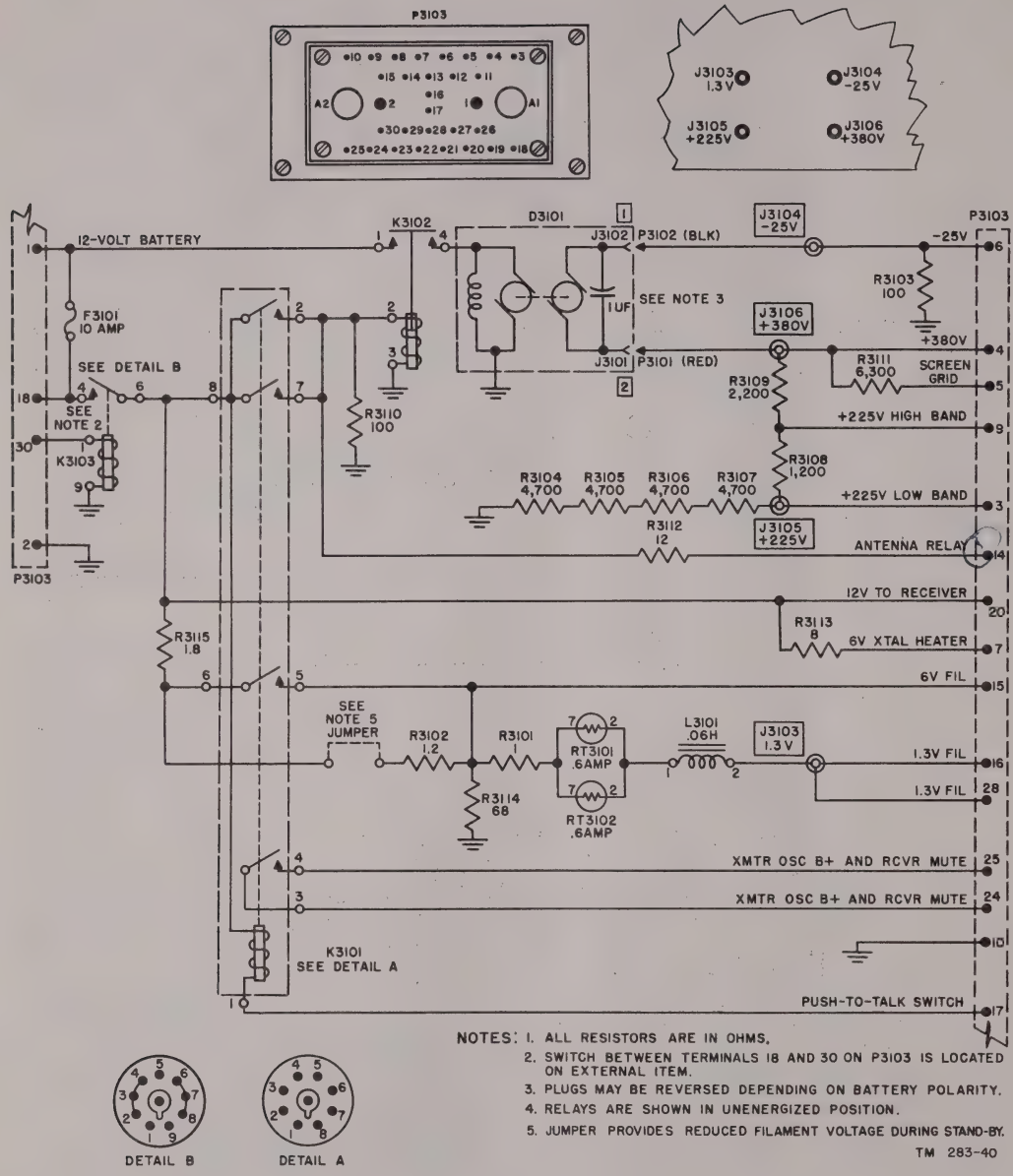


Figure 55. Dynamotor-Power Supply DY–100/U, schematic diagram.



NOTES:
1. ALL RESISTORS ARE IN OHMS.
2. SWITCH BETWEEN TERMINALS 18 AND 30 ON P3103 IS LOCATED ON EXTERNAL ITEM.
3. PLUGS MAY BE REVERSED DEPENDING ON BATTERY POLARITY.
4. RELAYS ARE SHOWN IN UNENERGIZED POSITION.
5. JUMPER PROVIDES REDUCED FILAMENT VOLTAGE DURING STAND-BY.

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Figure 56. Dynamotor-Power Supply DY–93/G, schematic diagram.

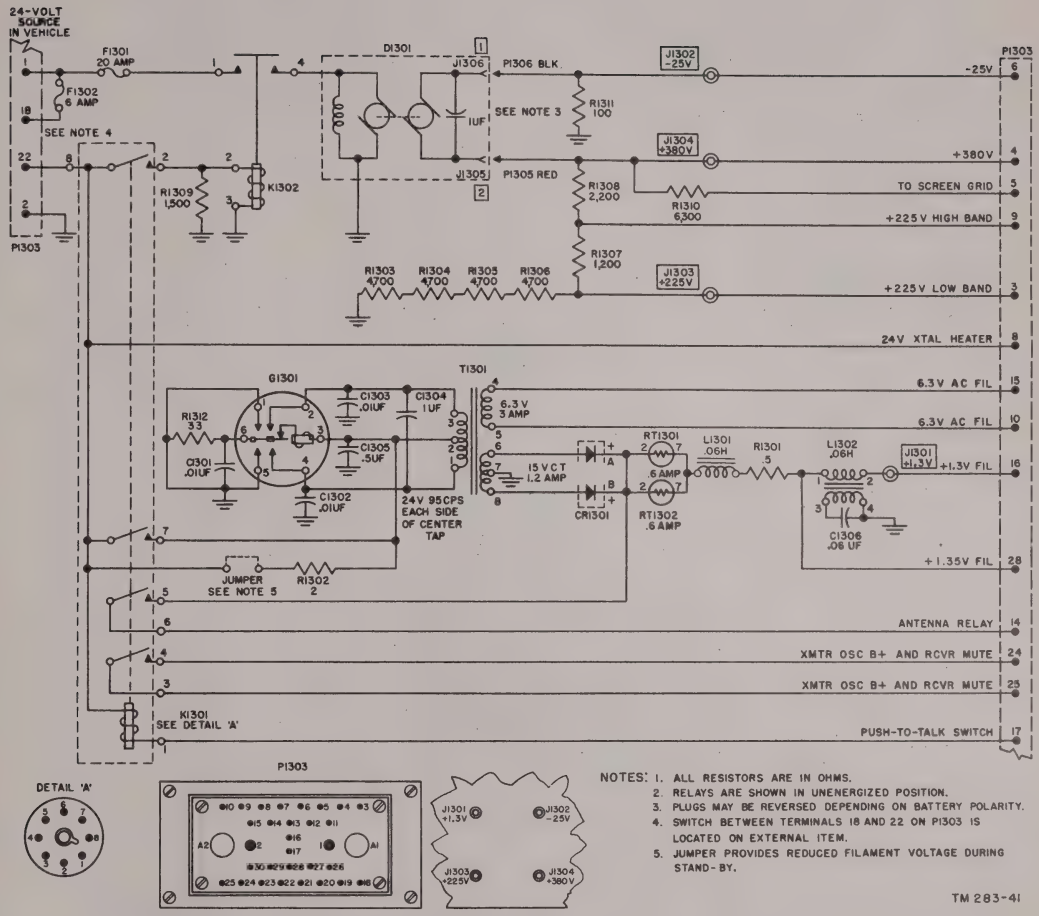


Figure 57. Dynamotor-Power Supply DY–98/G, schematic diagram.

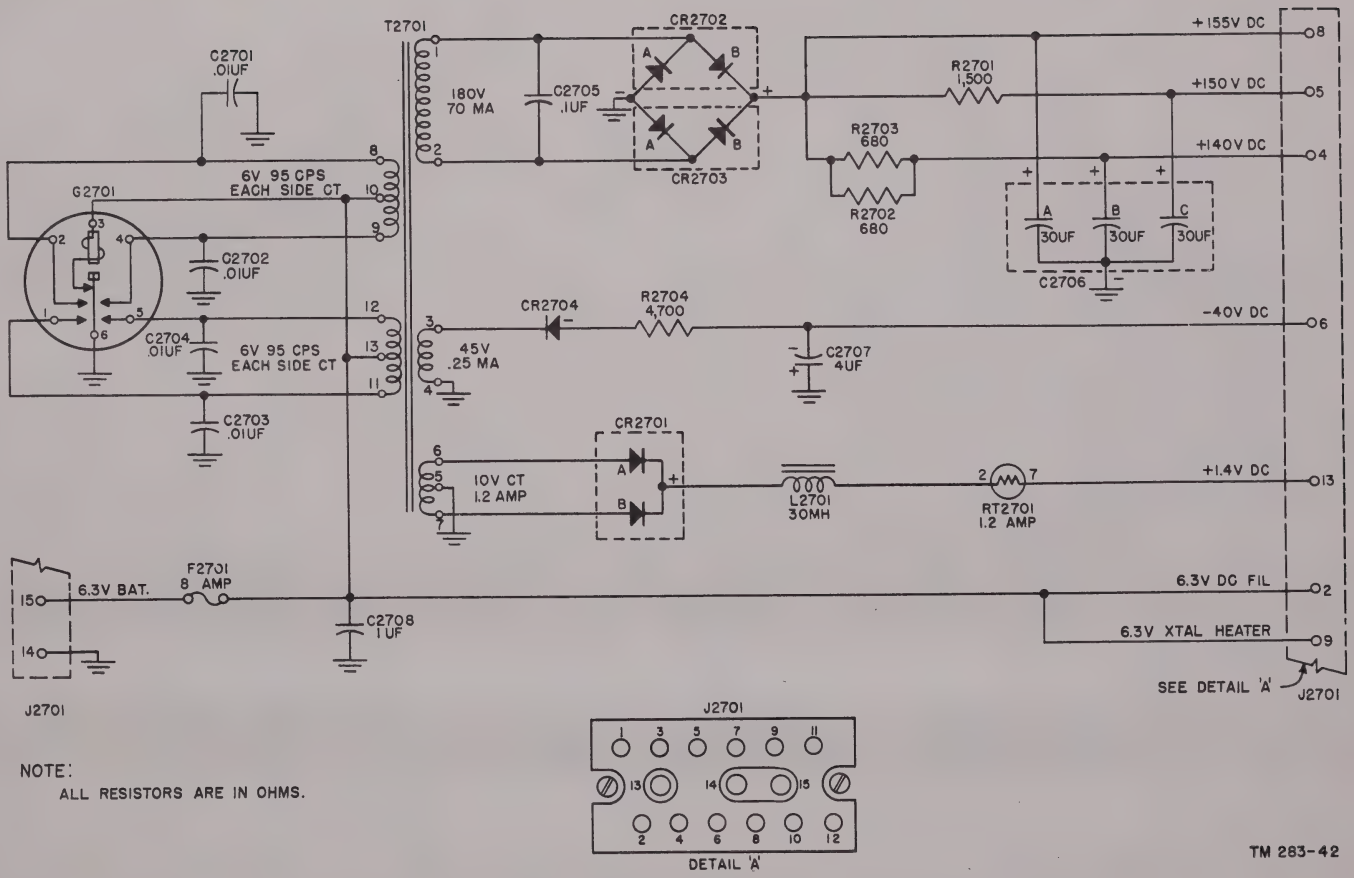


Figure 58. Power Supply PP-869/G, schematic diagram.

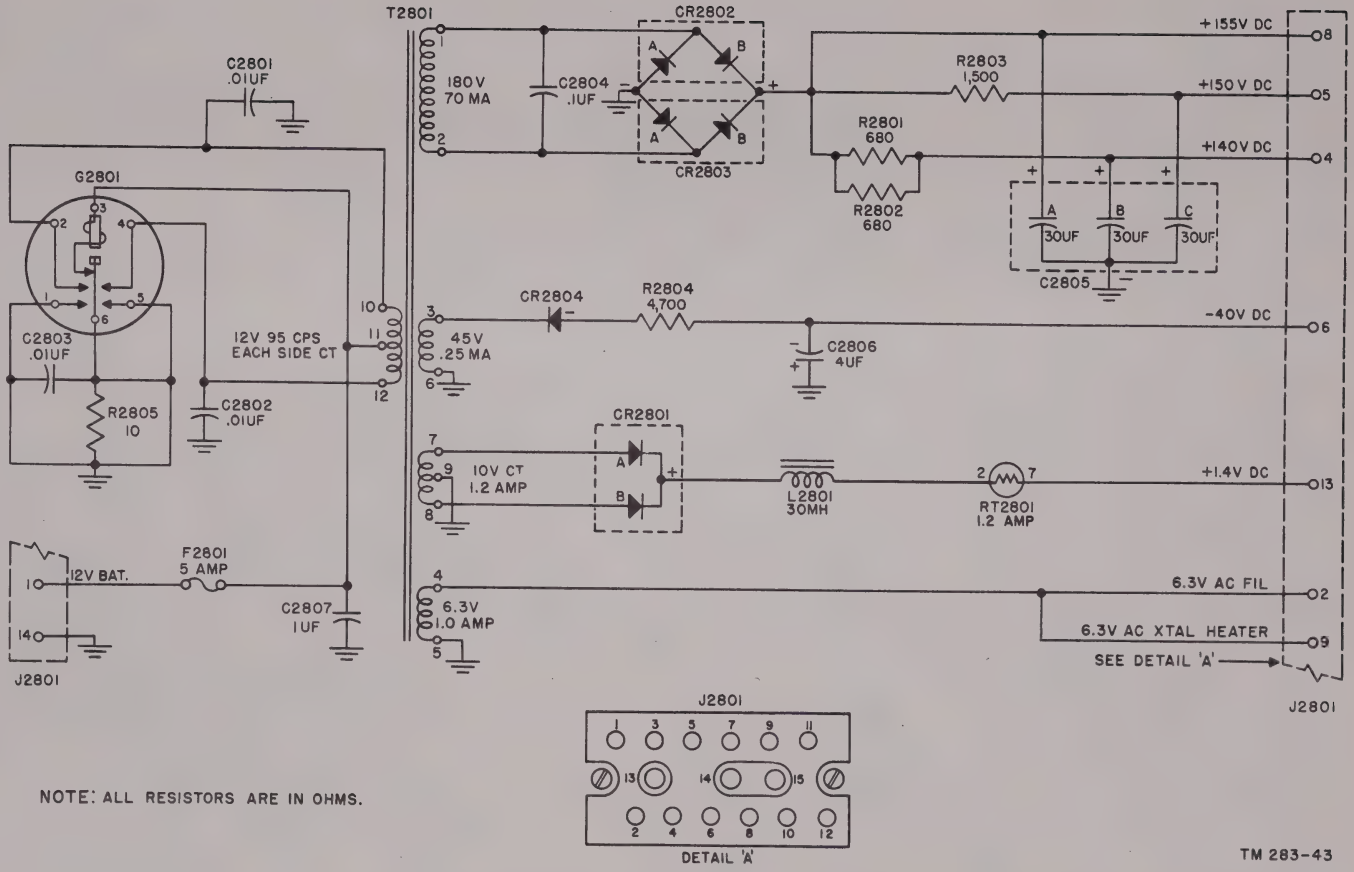


Figure 59. Power Supply PP-868/U, schematic diagram.

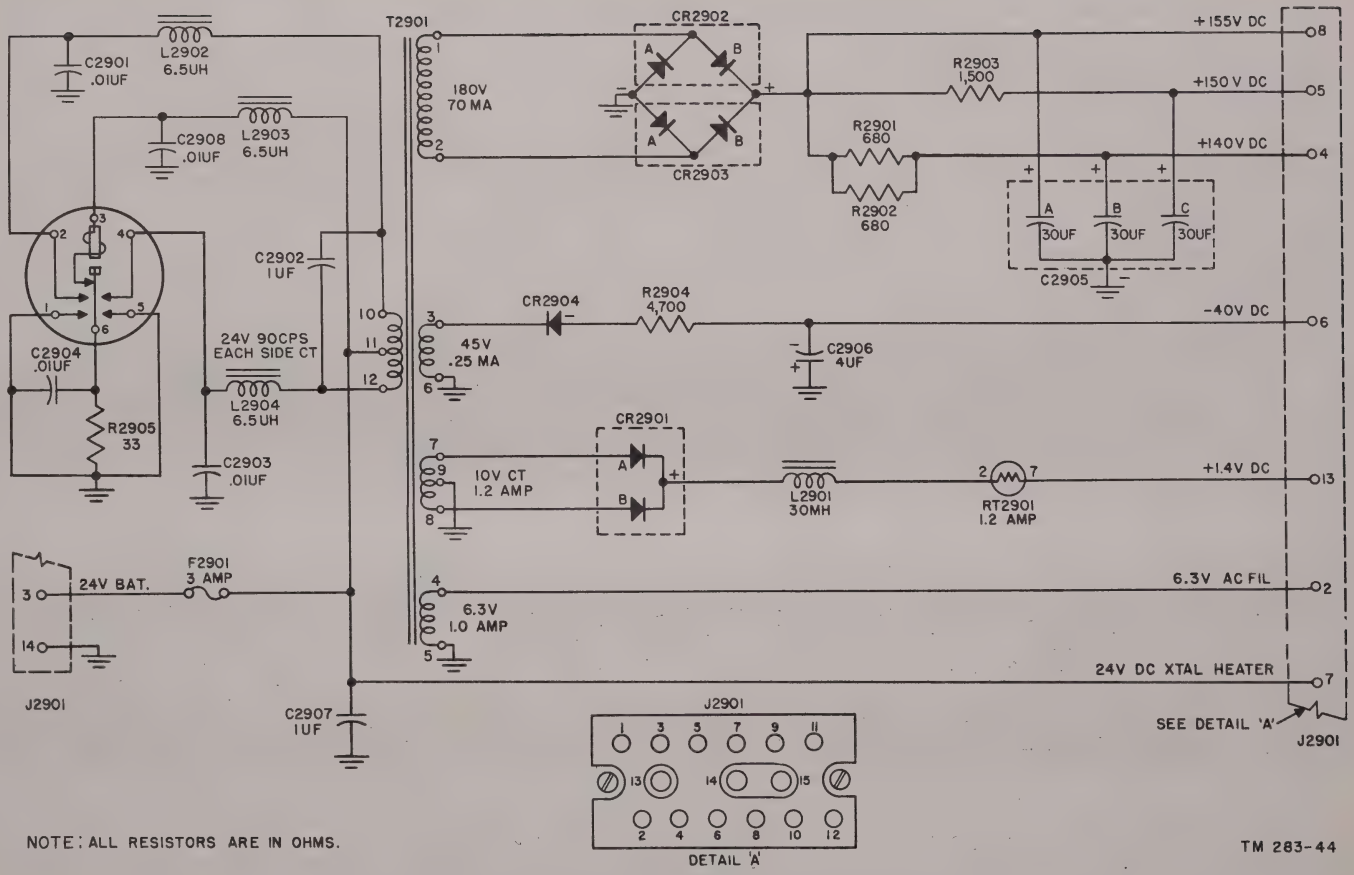
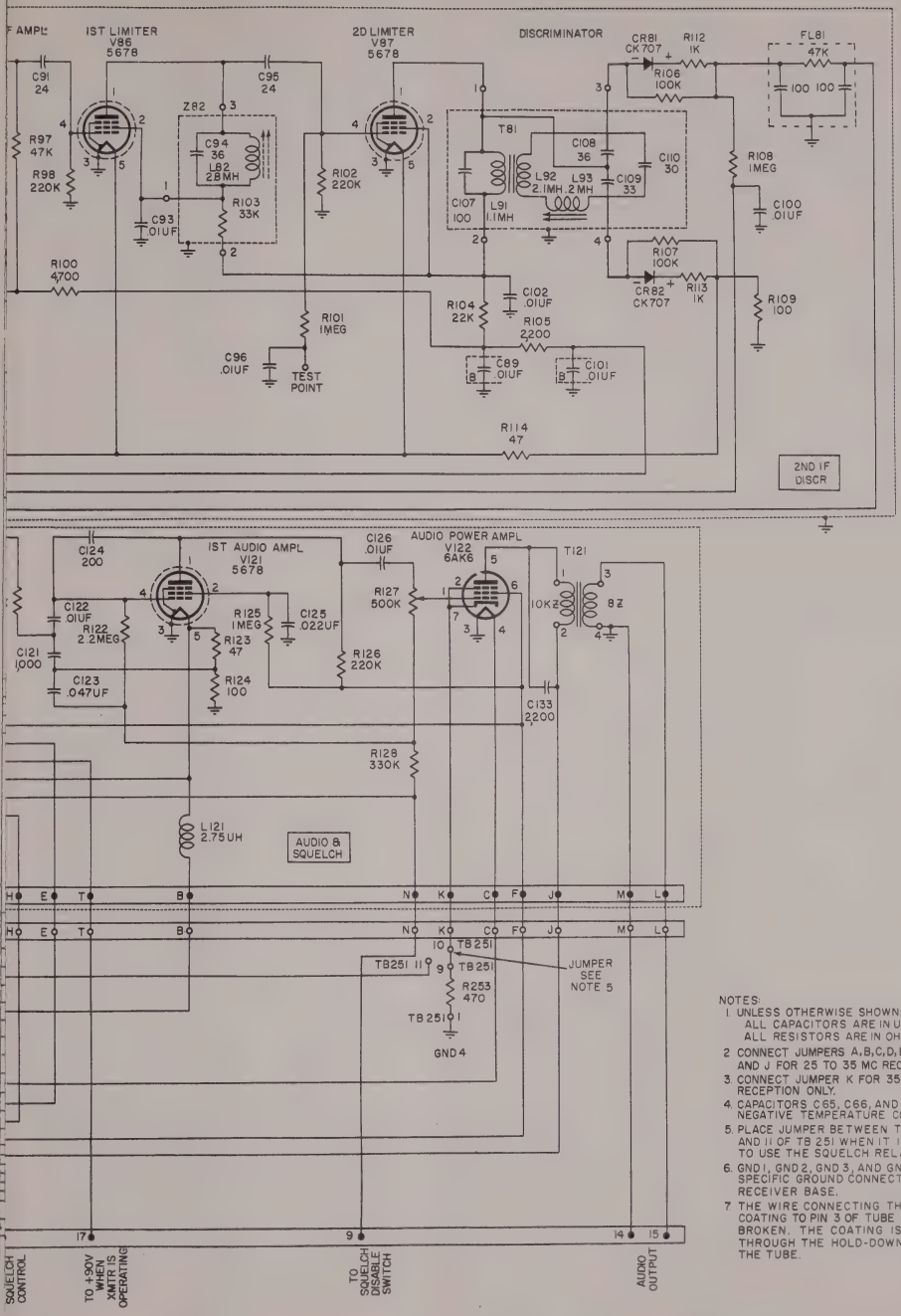


Figure 60. Power Supply PP-867/U, schematic diagram.



NOTES:

1. UNLESS OTHERWISE SHOWN:
   ALL CAPACITORS ARE IN UUF;
   ALL RESISTORS ARE IN OHMS.
2. CONNECT JUMPERS A,B,C,D,E,F,G,H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB 251 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND 1, GND 2, GND 3, AND GND 4 DENOTES SPECIFIC GROUND CONNECTIONS IN THE RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING TO PIN 3 OF TUBE V203 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE.

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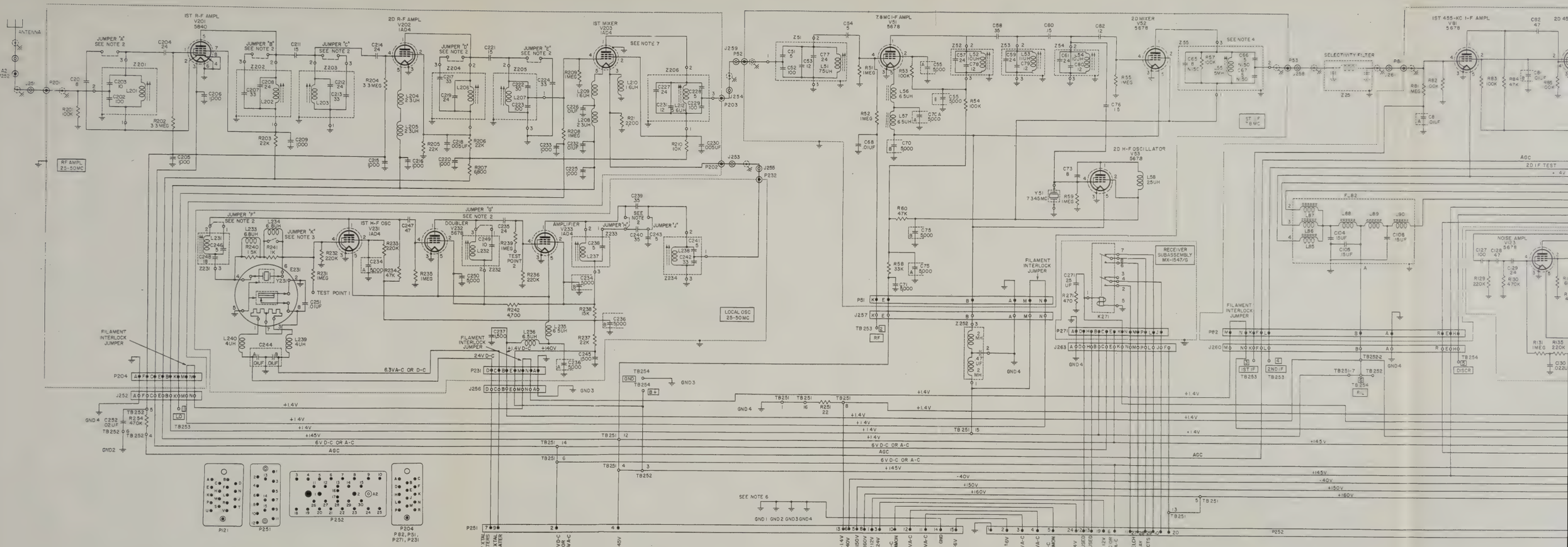
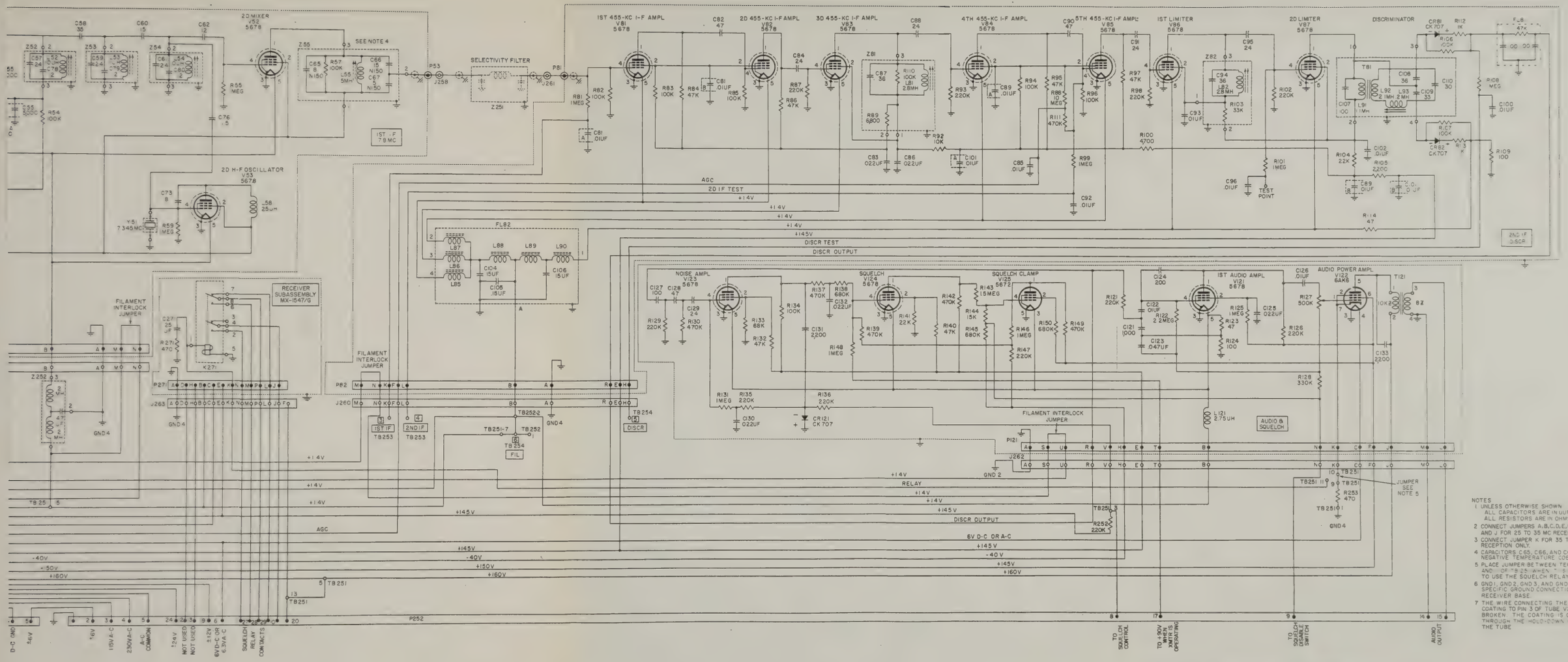
Figure 61. Radio Receiver R-257/U, schematic diagram.


ANTENNA
IST R-F AMPL V201 5840
2D R-F AMPL V202 1A04
IST MIXER V203 1A04
7.8MC I-F AMPL V51 5678
2D MIXER V52 5678
IST 455-KC I-F AMPL V81 5678
2D H-F OSCILLATOR V53 5678
IST H-F OSC V231 1A04
DOUBLER V232 5678
AMPLIFIER V233 1A04
NOISE AMPL V123 5678
JUMPER "A" SEE NOTE 2
JUMPER "B" SEE NOTE 2
JUMPER "C" SEE NOTE 2
JUMPER "D" SEE NOTE 2
JUMPER "E" SEE NOTE 2
JUMPER "F" SEE NOTE 2
JUMPER "G" SEE NOTE 2
JUMPER "H" SEE NOTE 3
JUMPER "I" SEE NOTE 3
JUMPER "J"
SEE NOTE 7
SEE NOTE 4
SELECTIVITY FILTER
RF AMPL 25-50MC
LOCAL OSC 25-50MC
RECEIVER SUBASSEMBLY MX-1547/G
FILAMENT INTERLOCK JUMPER
TEST POINT 1
TEST POINT 2
AGC
2D I-F TEST
6.3VA-C OR D-C
24V D-C
+140V
+1.4V
+145V
6V D-C OR A-C
-40V
+150V
+160V
GND1
GND2
GND3
GND4
P121
P251
P252
P204
P82, P51, P271, P231
24V XTAL HEATERS
6V XTAL HEATER
6VD-C OR 6.3VA-C
+145V
+1.4V -40V +150V +160V 124V
A-C COMMON
230VA-C
115VA-C
D-C GND
+6V
-6V
115VA-C
230VA-C
A-C COMMON
24V NOT USED
NOT USED
6VD-C OR 6.3VA-C
SQUELCH RELAY CONTACTS



NOTES
1. UNLESS OTHERWISE SHOWN ALL CAPACITORS ARE IN UUF; ALL RESISTORS ARE IN OHMS
2. CONNECT JUMPERS A, B, C, D, E, F, G, H, AND J FOR 25 TO 35 MC RECEPTION ONLY.
3. CONNECT JUMPER K FOR 35 TO 50 MC RECEPTION ONLY.
4. CAPACITORS C65, C66, AND C67 HAVE A NEGATIVE TEMPERATURE COEFFICIENT.
5. PLACE JUMPER BETWEEN TERMINALS 10 AND 11 OF TB25 WHEN IT IS DESIRABLE TO USE THE SQUELCH RELAY UNIT.
6. GND1, GND2, GND3, AND GND4 DENOTES SPECIFIC GROUND CONNECTIONS IN THE RECEIVER BASE.
7. THE WIRE CONNECTING THE OUTSIDE COATING TO PIN 3 OF TUBE V203 MUST BE BROKEN. THE COATING IS GROUNDED THROUGH THE HOLD-DOWN CLAMP AROUND THE TUBE

Figure 61. Radio Receiver R-257/U, schematic diagram.

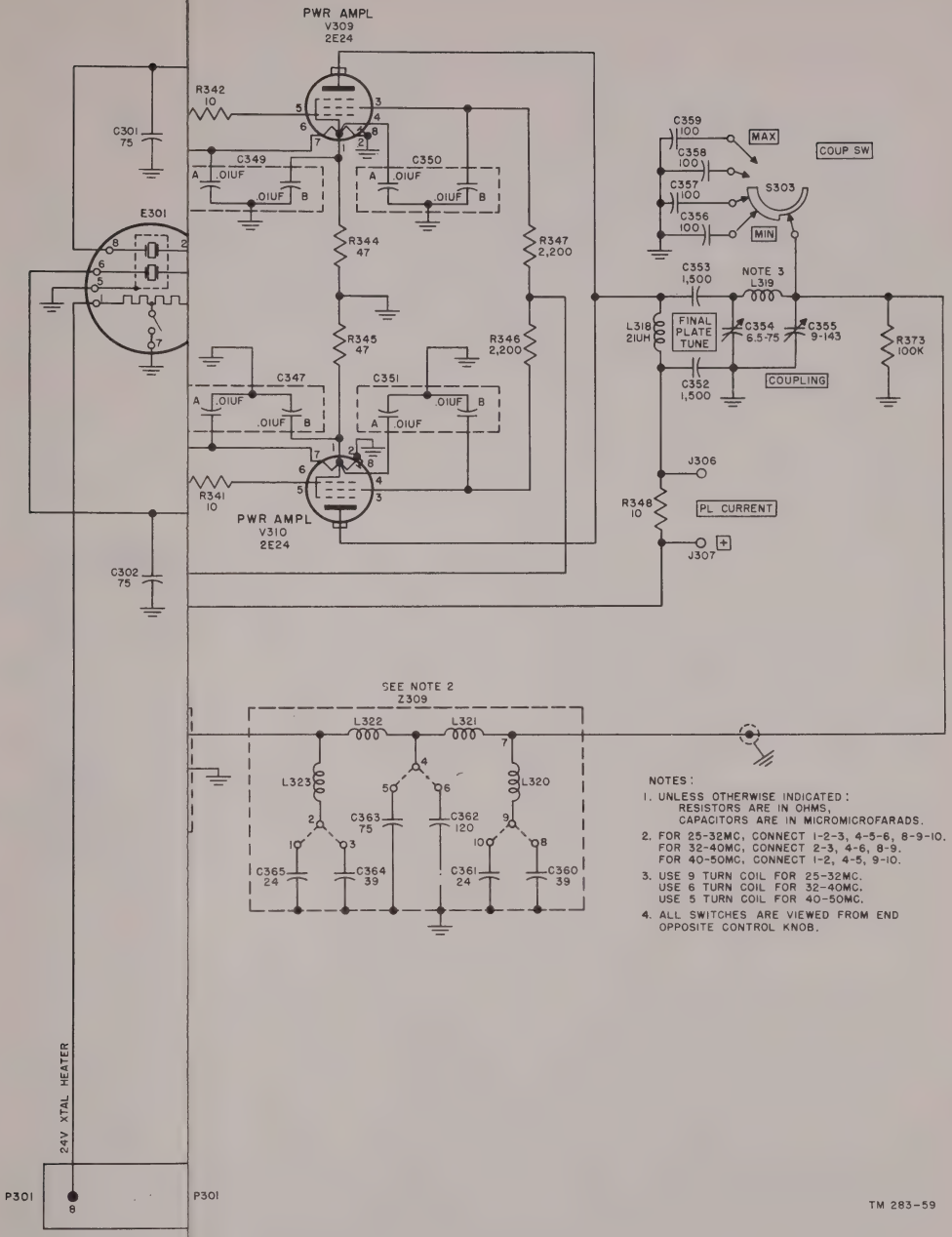


Figure 62. Radio Transmitter T-208/U, schematic diagram.

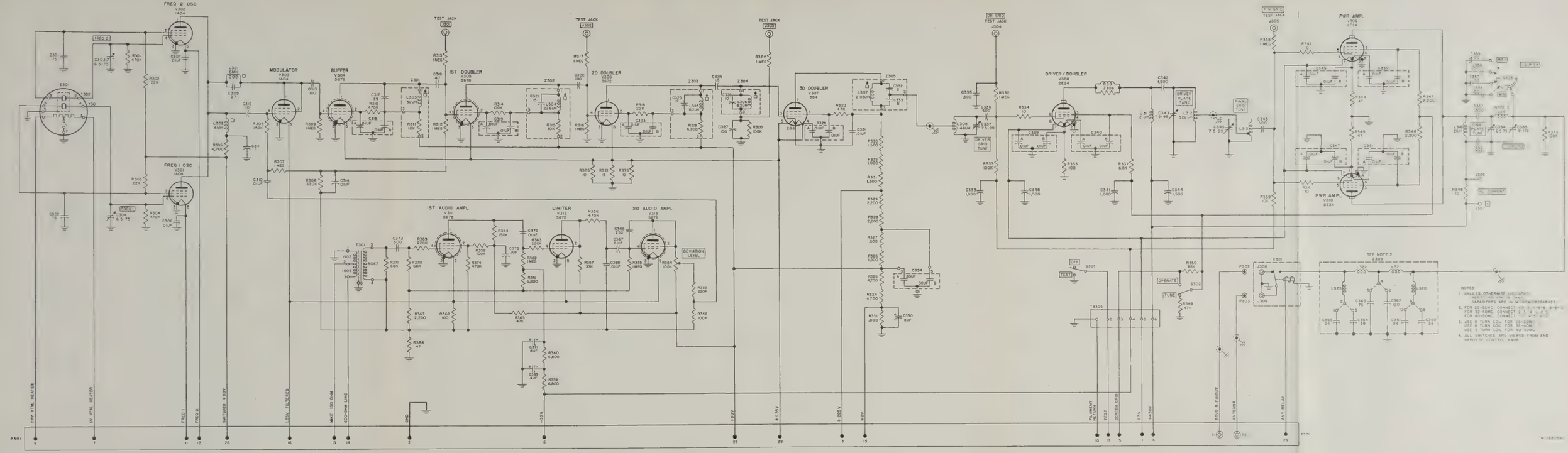


Figure 62. Radio Transmitter T-208/U, schematic diagram

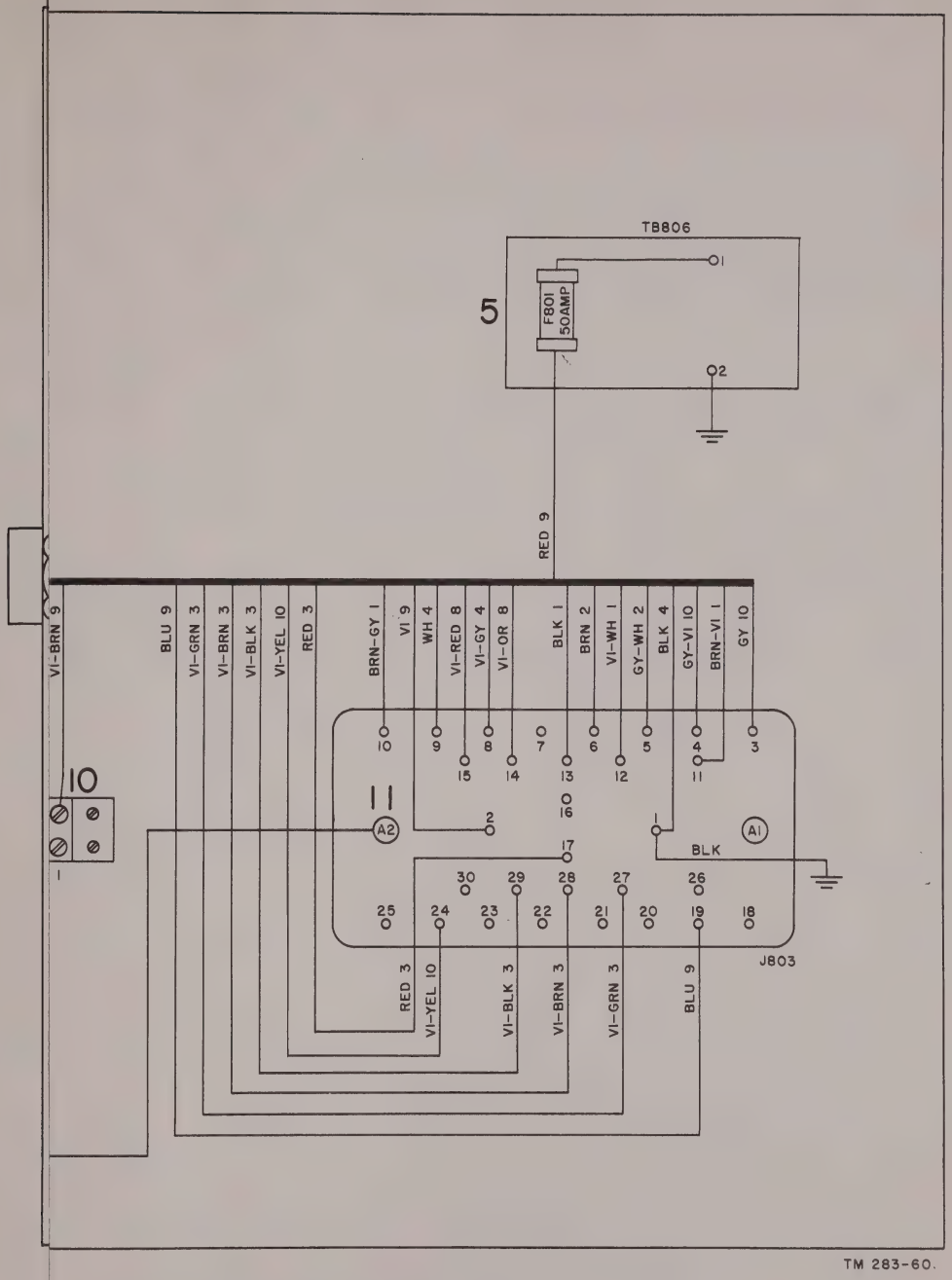
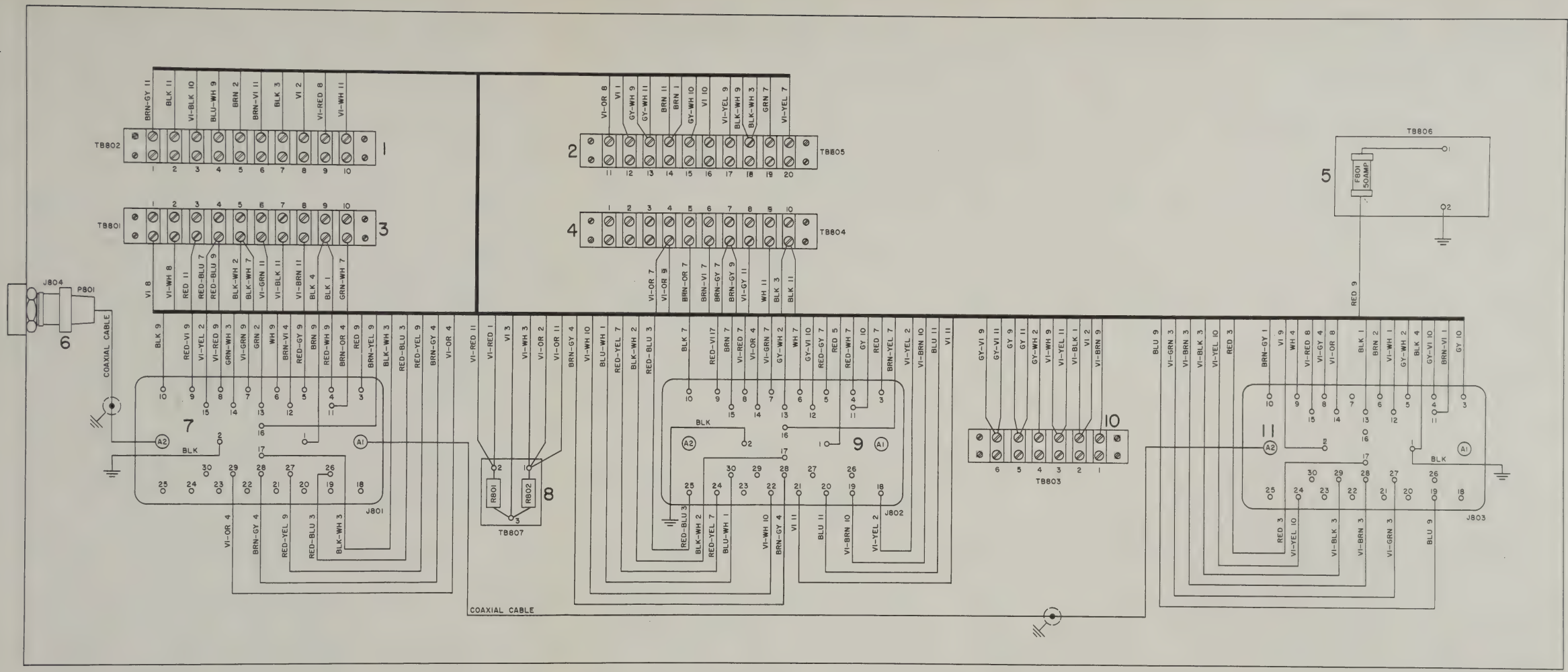
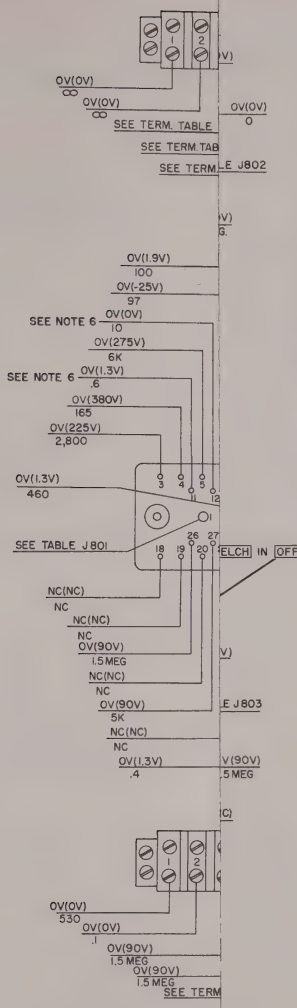


Figure 63. Electrical Equipment Cabinet CY-938/VRC, wiring diagram.



TM 283-60.

Figure 63. Electrical Equipment Cabinet CY-938/VRC, wiring diagram.



TERMINAL BOARD	TERMINAL	24-VOLT SYSTEM			12-VOLT SYSTEM			6-VOLT SYSTEM		
		E1 (VOLTS)	E2 (VOLTS)	R (OHMS)	E1 (VOLTS)	E2 (VOLTS)	R (OHMS)	E1 (VOLTS)	E2 (VOLTS)	R (OHMS)
TB801	5	24	0	17	12	0	17	6	0	17
TB802	3	24	24	∞	12	12	∞	6	6	∞
TB802	4	0	0	∞	12	12	∞	0	0	∞
TB802	5	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
TB802	6	6A-C	6A-C	1.7	6A-C	6A-C	1.7	6	6	1.7
TB803	1	0	0	∞	0	0	∞	6	6	∞
TB803	2	24	24	∞	12	12	∞	6	6	∞
TB803	3	24	24	∞	0	0	∞	0	0	∞
TB805	14	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
TB805	16	24	24	∞	12	12	∞	6	6	∞
TB805	17	24	24	∞	12	12	∞	6	6	∞
TB805	18	24	0	17	12	0	17	6	0	17
TB806	1	24	24	∞	12	12	∞	6	6	∞

TERMINAL	J 801								
	24-VOLT SYSTEM			12-VOLT SYSTEM			6-VOLT SYSTEM		
	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)	E_1	E_2	R	E_1	E_2	R
1	0	6A-C	1	0	6	.5	0	6	5
7	0	0	7	6	6	7	6	6	7
8	24	24	20	0	0	20	0	0	20
10	0	0	0	0	0	0	0	0	0

TERMINAL	J 802								
	24-VOLT SYSTEM			12-VOLT SYSTEM			6-VOLT SYSTEM		
	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)
1	24	24	∞	12	12	∞	6	6	∞
7	0	0	7	6	6	7	6	6	7
8	24	24	20	0	0	20	0	0	20
10	0	0	0	0	0	0	0	0	0
15	0	6A-C	.1	0	6	.5	0	6	5
17	24	0	17	12	0	17	6	0	17
18	24	24	∞	12	12	∞	6	6	∞
19	0	0	∞	0	0	∞	6	6	12
20	0	0	∞	12	12	10	0	0	∞
21	0	0	∞	0	0	∞	6	6	1.6
22	24	24	∞	0	0	∞	0	0	∞
30	0	0	∞	0	12	22	0	0	∞

TERMINAL	J 803								
	24-VOLT SYSTEM			12-VOLT SYSTEM			6-VOLT SYSTEM		
	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)	E_1 (VOLTS)	E_2 (VOLTS)	R (OHMS)
2	0	0	∞	0	0	∞	6	6	1.6
6	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
11	6A-C	6A-C	1.7	6A-C	6A-C	1.7	6	6	1.7
19	0	0	∞	12	12	10	0	0	∞
24	24	24	∞	0	0	∞	0	0	∞

NOTES:
1. THE FOLLOWING JUMPERS A
FOR 6-, 12-, AND 24-VOLT OP
3 AND 4 ON TB 801, 5 AND 6,
ON TB 802.
2. JUMPER ON TERMINALS 1 AN
OF TB 803 USED FOR 6- AN
OPERATION. JUMPER ON TE
AND 3 USED FOR 24-VOLT
VOLTAGE AND RESISTANCE
MADE WITH THE SPECIFIED
CONNECTIONS.

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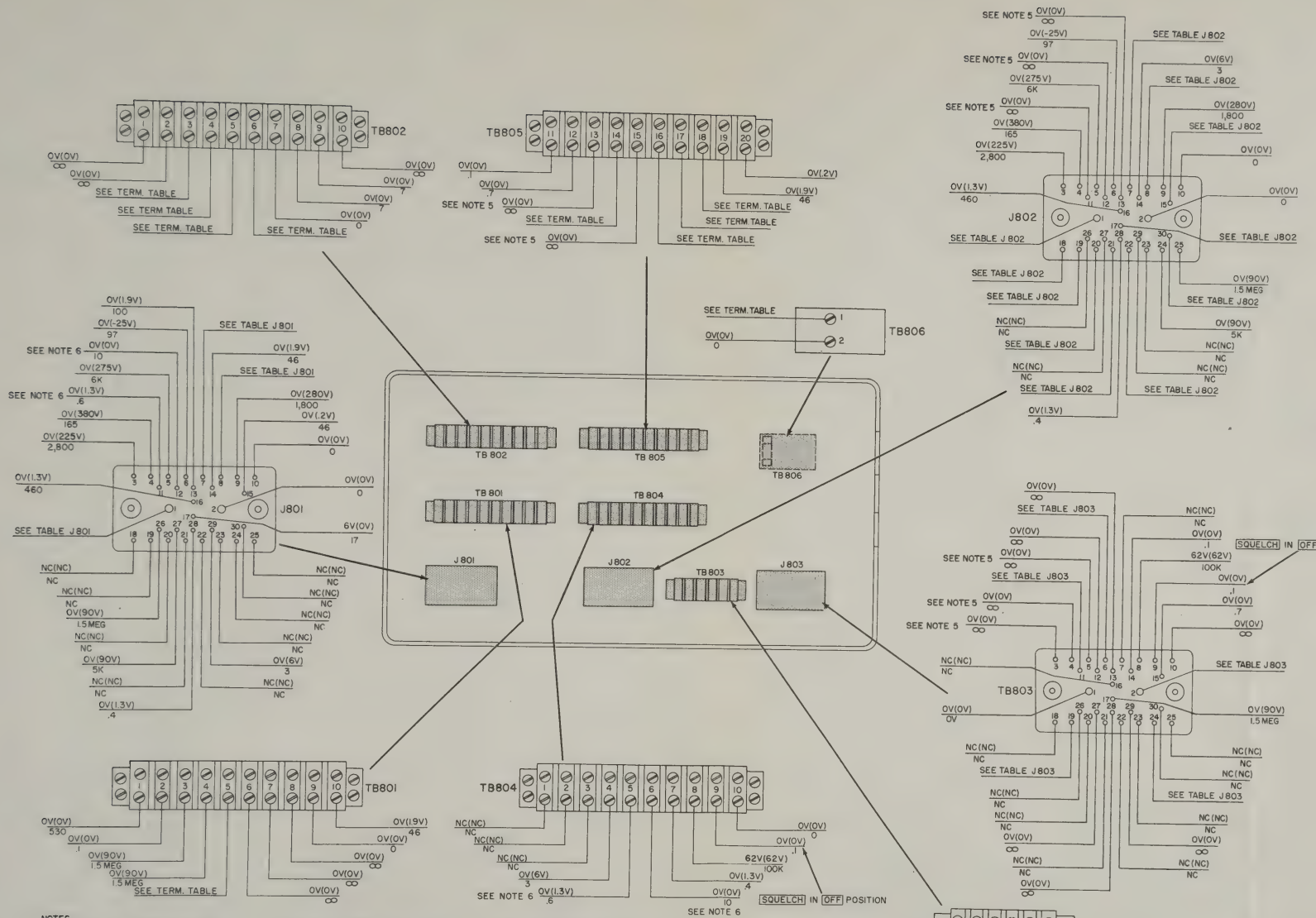
cal Equipment Cabinet CY-938/VRC, voltage and resistance diagram.



NOTES:

1. THE FOLLOWING JUMPERS ARE USED FOR 6-, 12-, AND 24-VOLT OPERATION: 3 AND 4 ON TB 801, 5 AND 6, 8 AND 9 ON TB 802
2. JUMPER ON TERMINALS 1 AND 2 OF TB 803 USED FOR 6- AND 12-VOLT OPERATION. JUMPER ON TERMINALS 2 AND 3 USED FOR 24-VOLT OPERATION. VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH THE SPECIFIED JUMPER CONNECTIONS.
3. VOLTAGES IN PARENTHESIS OR DESIGNATED E2 ARE VOLTAGES MEASURED WHEN THE PUSH-TO-TALK SWITCH IS OPERATED. VOLTAGES DESIGNATED E1 ARE VOLTAGES MEASURED WHEN THE PUSH-TO-TALK SWITCH IS NOT OPERATED. ALL VOLTAGES ARE MEASURED TO GROUND, D-C UNLESS OTHERWISE SPECIFIED.
4. DISCONNECT BATTERY SOURCE WHEN MAKING RESISTANCE MEASUREMENTS.
5. THESE TERMINALS CARRY 115- OR 230-VOLTS A-C IF A-C OPERATION IS USED.

J802	J803	TB803	TB805
11	3	4	13
12	4	5	15
13	5	6	

6. READINGS ON TERMINAL 11 OF J801, AND TERMINAL 5 OF TB804 MUST BE TAKEN WITH FREQ SWITCH IN POSITION 1, READINGS ON TERMINAL 12 OF J801, AND 6 OF TB804, MUST BE TAKEN WITH FREQ SWITCH IN POSITION 2.

TERMINAL BOARD	TERMINAL	24-VOLT SYSTEM E1 (VOLTS)	24-VOLT SYSTEM E2 (VOLTS)	24-VOLT SYSTEM R (OHMS)	12-VOLT SYSTEM E1 (VOLTS)	12-VOLT SYSTEM E2 (VOLTS)	12-VOLT SYSTEM R (OHMS)	6-VOLT SYSTEM E1 (VOLTS)	6-VOLT SYSTEM E2 (VOLTS)	6-VOLT SYSTEM R (OHMS)
TB801	5	24	0	17	12	0	17	6	0	17
TB802	3	24	24	∞	12	12	∞	6	6	∞
TB802	4	0	0	∞	12	12	∞	0	0	∞
TB802	5	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
TB802	6	6A-C	6A-C	1.7	6A-C	6A-C	1.7	6	6	1.7
TB803	1	0	0	∞	0	0	∞	6	6	∞
TB803	2	24	24	∞	12	12	∞	6	6	∞
TB803	3	24	24	∞	0	0	∞	0	0	∞
TB805	14	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
TB805	16	24	24	∞	12	12	∞	6	6	∞
TB805	17	24	24	∞	12	12	∞	6	6	∞
TB805	18	24	0	17	12	0	17	6	0	17
TB806	1	24	24	∞	12	12	∞	6	6	∞

J801									
TERMINAL	24-VOLT SYSTEM E1 (VOLTS)	24-VOLT SYSTEM E2 (VOLTS)	24-VOLT SYSTEM R (OHMS)	12-VOLT SYSTEM E1	12-VOLT SYSTEM E2	12-VOLT SYSTEM R	6-VOLT SYSTEM E1	6-VOLT SYSTEM E2	6-VOLT SYSTEM R
1	0	6A-C	1	0	6	5	0	6	5
7	0	0	7	6	6	7	6	6	7
8	24	24	20	0	0	20	0	0	20
10	0	0	0	0	0	0	0	0	0

J802									
TERMINAL	24-VOLT SYSTEM E1 (VOLTS)	24-VOLT SYSTEM E2 (VOLTS)	24-VOLT SYSTEM R (OHMS)	12-VOLT SYSTEM E1 (VOLTS)	12-VOLT SYSTEM E2 (VOLTS)	12-VOLT SYSTEM R (OHMS)	6-VOLT SYSTEM E1 (VOLTS)	6-VOLT SYSTEM E2 (VOLTS)	6-VOLT SYSTEM R (OHMS)
1	24	24	∞	12	12	∞	6	6	∞
7	0	0	7	6	6	7	6	6	7
8	24	24	20	0	0	20	0	0	20
10	0	0	0	0	0	0	0	0	0
15	0	6A-C	1	0	6	5	0	6	5
17	24	0	17	12	0	17	6	0	17
18	24	24	∞	12	12	∞	6	6	∞
19	0	0	∞	0	0	∞	6	6	12
20	0	0	∞	12	12	10	0	0	∞
21	0	0	∞	0	0	∞	6	6	1.6
22	24	24	∞	0	0	∞	0	0	∞
30	0	0	∞	0	12	22	0	0	∞

J803									
TERMINAL	24-VOLT SYSTEM E1 (VOLTS)	24-VOLT SYSTEM E2 (VOLTS)	24-VOLT SYSTEM R (OHMS)	12-VOLT SYSTEM E1 (VOLTS)	12-VOLT SYSTEM E2 (VOLTS)	12-VOLT SYSTEM R (OHMS)	6-VOLT SYSTEM E1 (VOLTS)	6-VOLT SYSTEM E2 (VOLTS)	6-VOLT SYSTEM R (OHMS)
2	0	0	∞	0	0	∞	6	6	1.6
6	6A-C	6A-C	1.6	6A-C	6A-C	1.6	6	6	1.6
11	6A-C	6A-C	1.7	6A-C	6A-C	1.7	6	6	1.7
19	0	0	∞	12	12	10	0	0	∞
24	24	24	∞	0	0	∞	0	0	∞

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Figure 64. Electrical Equipment Cabinet CY-938/VRC, voltage and resistance diagram.

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